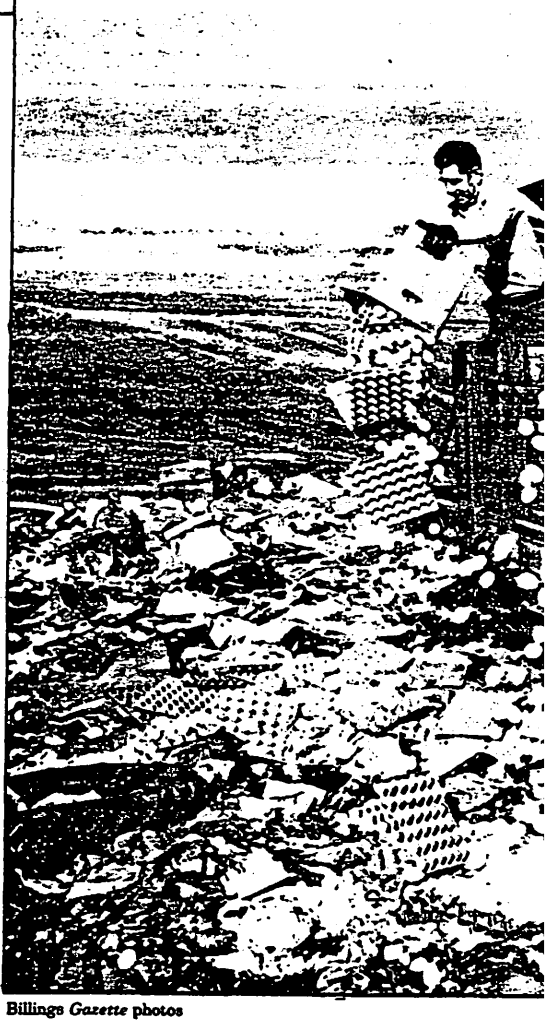
PCB's for Breakfast & Other Problems of a Food System Gone Awry

by Joan Gussow



Billings *Gazette* photos

When I first became concerned about the relationships between food and the larger environment, some 14 years ago, I had a vague awareness that there were environmental constraints on food production, a vagueness only partially dispelled by an issue of *Scientific American* on the biosphere in which Lester Brown had one of his characteristically alarming articles — this one entitled "Human Food Production as a Process in the Biosphere."

By the time I began teaching a course in nutritional ecology, I called the session on food and population "the photosynthetic limits." My perception of the problem then, in keeping with the understanding put forward in the early 1970s, was that there were limits to growth and that they were largely material limits. We would use up the natural gas we needed to make fertilizer (that seemed obvious even then) or the phosphate rock which we needed for the same purpose (but kept flushing down our sewers as dirty detergent just as if it were not a life-essential). Or we would run out of water or arable land (erosion was — and is — a terrifying problem).

It seemed clear that even if we overcame all those resource limits (as many people were urging that we most assuredly would), then ultimately we would come up against the fact that there was only so much solar radiation — only so much light available to power photosynthesis and make the plants grow. That led me to the understanding early in 1970 that energy was probably the limiting ingredient in our food systems. Even if we turned ultimately to synthesizing food, we would need energy to do so.

It was only in the course of putting together my book *The Feeding Web* that I began to perceive that the real limits were other than strictly "substantial" ones. Perhaps, indeed, the manganese nodules at the bottom of the sea — those nodules Howard Hughes' big boat was ostensibly going out to mine — were but exemplars of the fact that there would always be sources of raw materials. Perhaps the Federal Government was right when in response to the publication in 1972 of the volume *Limits of Growth* it pointed out that "the notion of resource exhaustion is ultimately unrealistic. . .the entire globe is at our disposal." And should we run out of earth, there was always physicist Gerard O'Neill assuring us that we could live in person-produced space colonies grinding up asteroid after asteroid for what useful materials they contain.

What began to become clear, however was that things kept going wrong that seemed to have nothing to do with our running out of materials — that might, in fact, only get worse if materials were unlimited. We were beginning to perturb biological systems on whose continued functioning our survival depends. A reporter recently wrote of what he called the "humbling complexity" of some of the systems of mutual plant and animal interaction in the Amazon. He was responding both to the ongoing destruction of the Amazon jungle, which has been called "the lungs of world," and to the clumsiness our species exhibits as we move toward simplifying the immensely complex system out of which we once evolved.

What is becoming frighteningly evident, where biological systems are concerned, is that we are utterly unable not only to control what will happen to them — we will not, as a headline suggested, "outwit" nature to produce more food — we are not even able to *predict* with any certainty what will happen in those systems *which we are most aware of being dependent upon.*

Climatologists tell us that we shall for a certainty have more "unstable" weather, though no one seems able to predict for sure whether the combined effects of our activities will cool or warm the earth. Either would wreak havoc with our established cropping systems, though only one would melt the polar ice-caps and flood the coastlines. That we are dissipating the ozone layer with fluoro-carbons — and perhaps other substances as well — seems confirmed, though we are uncertain at what point we shall markedly increase skin cancer among humans, and perhaps among livestock, who are without the partial protection of houses and clothing.

There is no shortage of problems from which to choose if one wishes to be concerned with the effects of our interventions into the biological systems which sustain us. One I wish to consider is chemical contamination of the food and water supply— not because it is necessarily the most important problem but because it is currently a matter of grave concern to a great many com-

A 1979 transformer leak put massive amounts of PCBs into animal feed. Residents dump 1365 dozen PCB contaminated eggs in Billings, Montana.

munities.

I have a number of clippings from the *Los Angeles Times* on the contamination of more than 50 Southern California wells with a solvent called TCE. I am especialy sensitive to stories about trichloroethylene, since 12 wells along a single road in the county where I live in New York State had to be closed last year because of gross TCE contamination. And, as is the case in Los Angeles, no one knows where the pollutant came from.

Now there are several possible responses to this sort of ground-water contamination. Outrage is a common response: many residents consider pure water their right as citizens. Indifference is another response: one El Monte man interviewed by the *Los Angeles Times* said he only drank Sparkletts and Coors anyway. One woman said she'd go on drinking the water because she had to die of something.

A spokesperson from one health department reflected what seemed a common *official* response, suggesting that the offending chemical could well have been dumped 20 or more years ago and that "standards for the disposal of such chemicals were less strict in the past." The implication, of course, is that even though we may have past messes to clean up we are now getting things under control. But are we?

In 1976 Congress passed the Toxic Substances Control Act which is supposed to give the government control over chemicals not already regulated under other laws, as well as to give the EPA the right to "clear" new chemicals *before* they enter the marketplace. But before the EPA could begin to regulate *new* chemicals, they naturally had to discover what was already out there. The pre-clearance law could not be implemented until the inventory was complete. According to the *EPA Journal* for January 1980, the inventory was completed on June 1, 1979 (three years after passage of the law) when a list was published of 43,278 compounds then in use.

Estimates of the number of new chemicals entering the marketplace every year range from an industry low figure of 100 "significant" ones to a high estimate of 1,000 new chemicals per year. According to a Presidential Toxic Substances Strategy Committee, production of all chemicals and allied products doubled in the 12 years ending in 1979. One EPA official estimated that in order to keep up with new introductions, the agency would have to rule on four new-chemical applications every working day.

Let us assume for the moment that the low figure for new chemicals is correct, and let us further assume that the EPA has been given sufficient funds to hire the personnel to carry out their mandate — an admittedly wishful assumption in a time of budgetary stringency and an administration determined to gut the agency and deregulate everything possible. What are they going to be asked to rule on? They are going to have to rule on whether the chemical is safe enough to be let out into the environment. I need not rehearse the difficulties inherent in coming to a rational safety decision regarding human exposure to chemicals which ethically only can be tested on animals. Such decisions have been difficult enough in regard to chemicals which are *intended* to enter the food supply in regulated amounts — intentional additives. Consider as an object lesson the fact that the National Academy of Sciences was unable to apply its own proposed safety criteria to a single substance, saccharine, which it had extensively studied. On what basis, then, will we make safety decisions about chemicals which are intended *not* to enter the food supply at all, and which, when they do enter it, do so accidentally in uncontrolled amounts?

Consider, for example, the chemical PBB — polybrominated biphenyls — a known toxin which entered the Michigan food chain accidentally in 1974 when one or more bags of PBB-containing fire retardant accidentally were mixed into animal feed. The economic interests of the companies involved, the fears of elected officials, and the moral compunctions of farmers combined in that circumstance to obscure

the facts about the damage done in a maze of accusations and denials. The five-year chronology of the Michigan PBB case makes fascinating reading for those who optimistically hope that regulation, followed by careful monitoring, followed by prompt discovery, followed by rapid condemnation of the contaminated food will be the standard scenario when accidents occur in an environment full of toxic chemicals.

PBBs, flame-retardant chemicals used in varied manufacturing processes, are known to cause cancer in laboratory animals, as are their chemical analogs, PCBs. In the Michigan case, when 2,000 pounds of PBBs accidentally were substituted for a feed additive for farm animals, it took almost a year for the trouble to surface and the source to be discovered.

During this period Michigan had marked decreases in milk production and increases in illnesses among cattle. Contaminated hens stopped laying eggs. Before the nature of the problem was determined, some of the animals had been recycled into feed for livestock. The poison thus went from farm animals to people on farms, then to their customers, through milk, meat, butter, eggs and cheese.

As a result, 30,000 cattle were destroyed, plus 1.5 million chickens and 7,700 other farm animals. Some farmers were forced into bankruptcy. There have been reports of damage to the nervous systems, livers and immune systems in farm residents.

In 1978, five years after the accident, two companies, the Michigan Chemical Company (Velsicol) and Farm Bureau Services, Inc., pleaded no contest to charges stemming from the event and were fined $4,000 each.

Or consider poly*chlor*inated biphenyls — PCBs—which used to be manufactured up the Hudson River from where I live in New York State. Such quantities of waste PCBs were dumped in the river that without extensive bottom dredging (which may not even work) fish from the river will be unsafe for generations. But PCBs are not supposed to be manufactured any more, and they are also supposed to be sealed into transformers where they are out of harm's way. Let me review briefly one documented PCB accident.

This one began in June 1979 when a broken transformer spilled 200 gallons of PCBs into a wastewater system at the Pierce Packing Company in Billings, Montana. By-products scooped from the wastewater were cooked into meat meal for animal food. By the time the problem was discovered it was necessary to investigate possible contamination in Arizona, California, Idaho, Illinois, Iowa, Kansas, Minnesota, Montana, Nebraska, New Jersey, North Dakota, Ohio, Oregon, Pennsylvania, South Dakota, Utah, Washington, Wisconsin and British Columbia!

A shipment of contaminated industrial grease on its way to Japan was turned back at sea. Seven million eggs, 1.2 million chickens, 30,000 turkeys, 5,300 hogs, two million pounds of industrial grease, 800,000 pounds of animal feed and 74,000 bakery items (as a minimum estimate) had to be destroyed.

What could have happened? How did the pollution spread so far before the problem was detected? As reported in *The New York Times* in September 1979 and in *Science* in January 1980: on July 6, 1979, in a routine inspection, a government poultry inspector sampled the chickens at Jolly Wholesale Poultry in Provo, Utah. He put the samples in a freezer and went on vacation for seven days. Five days after he returned the samples arrived at a San Francisco testing laboratory, where, after 10 days of testing, it was discovered that there was a problem: the chicken samples contained *five times the allowed levels* of PCB. Nine days later these samples arrived at the Meat and Poultry inspection regional office in Alameda. Three days later the agency's office in Boulder, Colorado, got word of the contamination. It took nine days to trace the chickens back to Jolly Wholesale Poultry. Five days later PCB was found in meat meal and a week later — 59 days after samples were taken — the company announced it would destroy the contaminated chickens. It took twelve more days to trace the contamination to the leaking transformer at Pierce Packing Company in Billings, Montana, by which time the PCBs had been consumed by a variety of humans and animals.

A study by the Office of Technology Assessment concluded that despite an apparently elaborate system of safeguards, there have been a frightening number of such incidents involving "wide distribution and partial consumption of food" tainted with chemicals never intended to enter the food chain. We are assured that so far there is no imminent threat to public health, although it is unclear just what that means when the import of the OTA report is that no one is really sure who has eaten how much of what. It has been suggested that the FDA should set up pilot programs to look for "unanticipated" chemicals in the food supply, though the cost is daunting: two million dollars for each state or regional laboratory set up to look for "unanticipated chemicals" and the cost for testing for each "unanticipated" chemical is about $10,000.

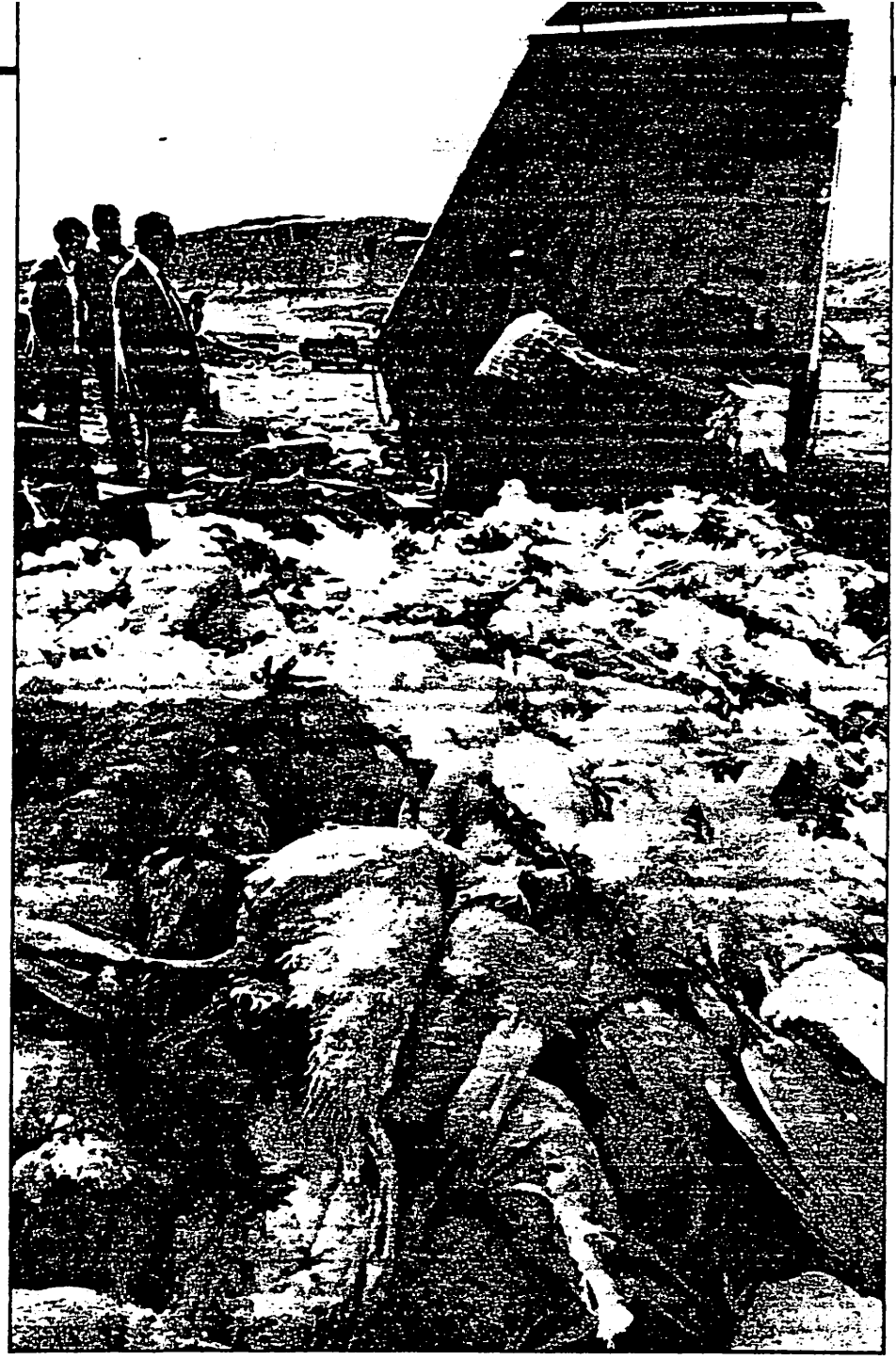
Now what does all this have to do with limits to growth and with the kinds of solutions which might be most appropriate if we are to maintain a sustainable food system? I began by saying I originally believed the limits to our present patterns of food production were "substantial" — that we would be limited by running out of something — phosphate, top soil, energy — which we needed to make the food system go. As my understanding evolved, I came to recognize that before we ran out of

UPDATE

Five years after the toxic chemical PBB was found in some livestock feed in Michigan, 97 percent of the residents of that state are believed to have residual levels of the toxic chemical in their bodies.

That was announced by scientists from the Environmental Sciences Laboratory of the Mount Sinai School of Medicine, and reported in the April 16, 1982, issue of the *Journal of the American Medical Association.*

An accompanying editorial by Dr. Dean W. Roberts of Hahnemann Medical College in Philadelphia expressed "concern" with "potential delayed effects attributable" to the storage of PBB in fatty tissue and possibly other tissues. The editorial added that "in view of the carcinogenesis lag time of up to two or three decades, it will be important to monitor a sample of the exposed population over a prolonged period."



Warden, MT resident dumps his flock of PCB contaminated laying hens.

anything material, we would exhaust the earth's capacity to tolerate our disruption of natural systems. We would be stopped when the effluents from our affluent culture perturbed some vital system beyond recovery.

But in the last two years I have come to understand that the real limit is one we have already reached — it is a limit on the size and the complexity of the systems which we ordinary humans can safely manage. This far-flung food chain on which we depend is run by people like you and me — people who go on vacation, who get bored with routine jobs, who fail to recognize "unanticipated" problems simply because they are unanticipated, who would rather not rock the boat. And what may be an even more important understanding is the fact that *the problem will not be solved* by setting up more sophisticated automated monitoring systems controlled by computers and other electronic gadgetry. For *even* if you trust the computers you cannot trust the humans who watch them. The more routine we make the human task, the more vulnerable the human becomes to boredom and inattention and the less safe we become.

Hazel Henderson, a brilliant economic visionary, has suggested that industrial cultures are approaching an evolutionary cul-de-sac which she calls the "entropy" state. "The entropy state," she writes, "is a society at the stage when complexity and interdependence have reached such unmanageable proportions that the transaction costs generated equal or exceed its productive capabilities. In a manner analogous to physical systems," she goes on, "the society winds down of its own weight, and the proportion of its gross national product that must be spent in mediating conflicts, controlling crime, footing the bill for all the social costs generated by the 'externalities' of production and consumption. . .begins to grow exponentially." One might well consider such an exponentially growing cost the assessment of some portion of 43 thousand-plus chemicals times $10,000 per chemical times however many state or regional laboratories will be brought into action in an attempt to guarantee that a single spill of PCB from a single broken hose in Billings, Montana, does not contaminate the food supply of 19 states.

Ground water contamination from carelessly disposed wastes can theoretically be controlled by setting up regulated clay-lined dump sites which will isolate the deadly wastes from local acquifers. But who will make sure that each small manufacturing plant, faced with rising costs and lowered profits, will use the "safe" dump and will not instead send its loaded trucks out at night to dump their contents on a vacant lot in the South Bronx or Oakland? Only recently has it come out that some people are hoping to ship their toxic wastes abroad — to developing countries with less strict (!) laws than ours. Current U.S. policy does not forbid such shipments — leaving it to the receiving countries to make their own decisions. The notion of sending it all *away* becomes less enticing when one recalls that on a globe there *isn't* any away — that what we throw over our shoulder today will come over the horizon and hit us in the face tomorrow. At the least we should probably exercise caution — avoiding importing food from countries to which we ship our toxic wastes.

One of my students, investigating the

(Continued on page 28)

PCB's for Breakfast

(Continued from page 19)

possible contamination of a major New Jersey acquifer by a waste dump built on top of it, found herself looking at a table of parts per million of various hydrocarbons found in the water from a nearby well. Feeling unqualified to judge what the figures meant, she went to the local health department and asked the person in charge "What *should* water have in it?" He looked at her and said "H_2O." She and I found it striking that she should have had to ask. Taken *en masse*, my students' investigative term papers this year convinced me that once highly toxic persistent chemicals have been manufactured, they *will* get into the human food chain through human ignorance, carelessness, indifference or greed.

You can work out within your own frames of reference the implications of that possibility. For myself, it is probably clear from what I have said that I believe we must work toward smaller, more localized food systems over which we have some measure of personal control, and that we must also work toward the total elimination of manufactured substances which have certain combinations of persistence and toxicity. But what I believe most strongly is that some significant portion of nutrition professionals must come to recognize that helping make such decisions is part of our job. It is often non-nutritionists for example — among them Frances Moore Lappe and Joseph Collins, co-founders of the Institute for Food and Development Policy, who do the most provocative thinking about the world food crisis.

Whose job is it to worry about the U.S. food supply? Whose job is it to think about what our food system will look like in the year 2000? Who should be worrying about whether people will be able to buy enough food at a price they can afford, and whether they will know what kinds of foods to buy to maintain their health? Whose job is it to worry about what will be in that food — both advertently and inadvertently?

Is that the job of food processors, the agricultural economists, the farmers, the government? Whose fault is it that we have built over much of the best farmland in the United States and that we are letting much of the rest of it run off in rivers of topsoil? Whose responsibility was it that we developed an agriculture that is both ruinous to cropland, heavily dependent on energy and toxic chemicals, dangerously narrow genetically, and economically structured so as to be ruinous to the stability of rural life and to the livelihood of the small farmers whom Jefferson saw as the backbone of our society? Who is responsible for the fact that we have a food supply notable for its sheer abundance, its illusion of variety and its tastelessness (in both senses of that word), as well as for its level of nutrient fortification, in a country which has the highest per capita ownership of refrigerators *and* the highest per capita consumption of food additives? If it is not our job to worry about these things, whose job is it? Is it really a matter of consumer choice when a culture takes two foods: corn and rice — foods which have a nearly zero storage energy cost — and turns them into frozen popcorn and Birdseye Frozen Italian Rice?

Either someone thinks about the system as a whole — and about the implications for the future of food of toxic chemicals and topsoil loss, insect resistance to pesticides, the loss of genetic diversity, the waste of energy in food processing and so on — or we simply go on pretending nutrition has only to do with what happens after food leaves the throat, ignoring the abberations of a system so vulnerable to human error that it may one day soon leave us short of wholesome food to put in our mouths.

I do not intend to suggest that I have discovered the right answers to these rather terrifying and complex problems that face this country and the world in the next decades. I will be happy, however, to defend my conviction that I am asking some of the right questions. I feel very strongly that someone in the field of food and nutrition — as well as everyone else who eats — must begin to worry about the systems that bring us food — and about whether they are sustainable enough so our children and their children will have something safe and healthful to eat. ■

Joan Gussow, who just completed a year's sabbatical, has returned to her post as Chairperson of the Nutrition Education Department of Teachers College, Columbia University.

The Press. . .

(Continued from page 15)

Here and there it is also possible to find a paragraph or two to the effect that developing countries must make major changes in their social and economic structures, or that the hungry have no means to buy food. But these observations are offered as mere asides to the much larger issues of controlling population, increasing production, and injecting massive amounts of development money into the third world.

As for articles dealing explicitly with rural power structures and land distribution, we found them to be rare indeed — an average of 1.5 per year for the three papers combined. Generally, these dealt with particular countries, or specific regions of countries, thus making it virtually impossible for readers to grasp the significance, worldwide, of "power-distributional" considerations. Further, while the "scarcity" articles often received prominent play, the few presenting an alternate view were, as a rule, presented without photographs and charts and were placed deeper into the paper. Most, incidentally, were written by free-lancers.

Social scientists are divided on the questions of what causes world hunger and how it can be alleviated. Many experts hold to a basically Malthusian view; a growing body of specialists takes a fundamentally different approach. The press has eloquently presented the views of one party to this debate, in the process raising our consciousness regarding the scope of world hunger. Now the time would seem ripe for reporters to raise their own consciousness — and that of the public — regarding new ways to view, and perhaps to solve, a problem affecting the lives of millions. ■

David Nugent and Michele Cros are graduate students in anthropology at Columbia University. Research for this article was funded, in part, by the Center for Study of Responsive Law, a nonprofit, public interest group. This article is reprinted with permission from the Columbia Journalism Review.