

## Don't Eat That Apple!

Leigh, a sixth-grader, planted a garden. But it wasn't an ordinary garden. It was "organic." Leigh fertilized the plants with compost rather than chemicals and applied no pesticides while they were growing. (She did use a bug killer for the aphids on the vegetables when they were harvested.)

Leigh went to the trouble of planting a chemical-free garden because she had been taught that agricultural chemicals were dangerous. They "poison birds, animals and water supplies and also get in the food," she explained.<sup>1</sup> Leigh had probably read about pesticides in her textbooks.

- ◆ *The Kids' Environment Book*, which talks about the 2.5 billion pounds (1.1 billion kilograms) of "toxic gunk" on our crops,<sup>2</sup> and recommends organic gardening or, at least, buying organic foods.
- ◆ Or *This Planet Is Mine*, which says that the "lack of toxic substances" makes organic foods safer. "Logically, what's less risky for humans to consume is also a safer choice for the environment," this book states.<sup>3</sup>

Our children's books treat farm chemicals as dangerous by-products of technology that should be banned or severely restricted. To many authors, pesticides are killers and should be eliminated at all costs:

- ◆ The text *Earth Science* warns that “the poisons that pour into rivers and lakes—and even into the oceans—become concentrated in fish in percentages large enough to make the fish unfit to eat . . . Insecticides have been responsible for killing fish in rivers.”<sup>4</sup>
- ◆ “It is estimated that as many as 1.5 million people suffer poisoning by pesticides each year, because they do not use the necessary safety precautions to prevent exposure to these dangerous substances,” says the text *Food For Life*.<sup>5</sup>
- ◆ Anne Pedersen advises that if you can't grow your own garden “the next best thing is to buy *organic* produce . . . It's usually more expensive and maybe doesn't look quite as picture-perfect . . . but it's probably safer.”<sup>6</sup>

### **The Other Side of the Story**

Chemicals have transformed farming. Pesticides have nearly eliminated the ancient scourge of insect infestation, and fertilizer allows farmers to restore the nutrients that plants take from the soil as they grow. An Environment Canada publication, citing a Hudson Institute book, says that pesticides are reducing cancer rates because their use has introduced more fruits and vegetables into the North American diet.<sup>7</sup>

But chemicals have disadvantages, too. Pesticides that harm insects can also harm humans and animals. The nutrients from fertilizers, while vital to crops, also spill over into waterways, where they

encourage the growth of algae that can smother other plant life and fish. Some chemicals may reach pools of underground water that provide drinking water.

These days, what worries people the most is whether pesticide residues on food can cause cancer. Some scientists think that small amounts of pesticide left on food—amounts usually measured in parts per million or parts per billion—increase the risk of cancer. Yet the evidence for this is extremely weak. In 1996 a U.S. National Academy of Science report said that levels of chemicals in Americans' diet are "so low that they are unlikely to pose an appreciable cancer risk."<sup>8</sup> Canadian regulatory standards are even more stringent than those in the United States.<sup>9</sup>

### **DDT: Scare Number 1**

Much of the fear about pesticides stems from concern about one product, DDT. The fear began with Rachel Carson's 1962 book *Silent Spring*. Carson treated DDT as a dangerous chemical that had killed wildlife and might be causing cancer to humans. Carson's attack on DDT shocked the world because it contradicted what everyone had believed about this "miracle" chemical.

DDT had saved thousands of lives by killing mosquitoes that carried malaria and typhus. By the time it entered commercial use in 1947, says historian Thomas R. Dunlap, it "had a reputation for effectiveness, power and safety unmatched by any other material."<sup>10</sup> Unlike most insecticides of the day, it caused no acute harm to people and its effect was long-lasting, so that repeated applications were not necessary. DDT appeared to be so safe that farmers, foresters, and municipal authorities quickly adopted it after the war.

Clearly, DDT was safe for people to use in the short run. But what about the long run? DDT builds up in the tissues of animals and people, and Carson raised concern that it could cause cancer.

This fear has been refuted to most scientists' satisfaction. In 1989, three public health scientists who had followed nearly one thousand people for a decade reported in *Science* magazine that they had found "no relation between either overall mortality or cancer mortality and increasing serum DDT levels [that is, levels of DDT in body fluids]." <sup>11</sup>

The strongest case against DDT was not that it caused cancer in humans but that it was causing birds to die. Carson's book evoked the image of a "silent spring" in which no birds would sing. She suggested that DDT accumulated in the tissues of birds, especially predatory and fish-eating birds like eagles and falcons. By causing their eggshells to thin, DDT was destroying their ability to reproduce.

The question of whether DDT does hurt the reproductive ability of bird populations is still not completely resolved. A thorough review of scientific literature revealed that while some studies show a correlation between eggshell thinning and DDT, others did not. <sup>12</sup> However, the evidence, plus the fact that many birds at the top of the food chain like falcons and eagles have recovered in number since DDT was banned, suggests that DDT was at least partly responsible. (It is also possible, though, that other chemicals, such as polychlorinated biphenols [PCBs], which are used in electrical transformers, contributed to eggshell thinning.) <sup>13</sup>

Canada began tightening restrictions on DDT in 1969, and production and import were officially discontinued in 1985. In 1972, the U.S. EPA imposed a nearly complete ban on the pesticide, due more to political pressure rather than clear scientific evidence. This ban is viewed as an important victory in the texts, a triumph of environmental activism over the evils of modern technology. But some of the consequences were unfortunate.

Pesticides that are more toxic to humans replaced DDT and they had to be applied more often. These posed (and continue to pose) serious dangers to farm workers. <sup>14</sup>

In at least one country, Sri Lanka, a DDT spraying program, which had virtually eliminated malaria in Sri Lanka, was stopped. When Sri Lanka stopped using DDT, the number of malaria cases rose again to 2.5 million in the years 1968–1969.<sup>15</sup> Today, throughout the world, malaria still kills between 1 and 2 million people per year.<sup>16</sup>

## Apple Hysteria

One legacy of *Silent Spring* is periodic hysteria over small amounts of chemicals. In early 1989, the CBS show “60 Minutes” called *Alar*, a chemical used on apples, “the most potent cancer-causing agent in our food supply.” And the elegant actress Meryl Streep appeared on the Phil Donahue Show to alert parents to its dangers.

The U.S. EPA had been considering a ban on *Alar* because of animal tests suggesting that it might be carcinogenic. But an environmental group, the Natural Resources Defense Council, didn’t want to wait for EPA to decide. It orchestrated a public relations campaign against *Alar* that scared nearly everyone. Parents inundated pediatricians with phone calls and schools stopped serving apples.

As the furor mounted, the EPA, the U.S. Food and Drug Administration, and the U.S. Department of Agriculture issued a statement assuring parents that eating apples did not pose “an imminent hazard” to children.<sup>17</sup>

*Alar* is a growth regulator, not a pesticide—it keeps apples on trees so that they can stay crisp and attain a deep red color. It is regulated by the Pesticide Management Regulatory Agency in Canada, and by the EPA in the United States.

While a few tests on animals had shown that it could cause tumors in animals, the doses were so massive that some animals died simply because the dose overwhelmed their systems, not because of cancer.<sup>18</sup> According to one source, a human being would have to eat 28,000 pounds (12,727 kilograms) of apples daily for seventy years to

produce tumors like the ones the mice developed.<sup>19</sup> Yet the *Alar* hysteria was so intense and the political pressures so great that the manufacturer halted production.

## Facts, Not Fears

What are the facts about pesticide residues? British researchers Richard Doll and Richard Peto are highly respected for their studies of the causes of cancer.<sup>20</sup> In 1986, they concluded that all environmental pollution, taken together, may have contributed to 2 percent of all recent cancer deaths. As for pesticide residues, they are “unimportant” as an explanation for any cancer today, these experts said.<sup>21</sup>

Lifestyle, family history, and diet appear to have a lot more to do with whether people develop cancer. When cancer rates in the United States are adjusted to take into account the changing age of the population and to exclude the contribution of smoking, the risk of cancer is either the same or decreasing.<sup>22</sup> The Canadian Cancer Society estimates that 35% of all cancers are related to unhealthy diet (low in fruits and vegetables).<sup>23</sup>

It is ironic that people are so concerned about synthetic pesticides and yet ignore natural ones. Plants produce natural toxins to protect themselves against insects and other predators. When natural chemicals are tested on animals, some turn out to be carcinogenic, just as do some synthetic chemicals. (About the same percentage of the natural pesticides—about 50 percent—cause malignant tumors in animals as do synthetic pesticides.)<sup>24</sup> Based on animal tests, coffee and cocoa, spices such as cinnamon and mustard, and fruits such as pineapples and plums all have natural carcinogens.<sup>25</sup>

Plants that are naturally pest-resistant have higher concentrations of natural pesticides.<sup>26</sup> In fact, the U.S. 1996 National Research Council report quoted earlier, which said we shouldn't worry much about chemicals in our foods, also stated that natural components

may be of “greater concern” than synthetic ones.<sup>27</sup> An Environment Canada publication claims that the risk caused by drinking a daily glass of apple juice produced from Alar-treated fruit would be 58 times less risky than consuming the natural carcinogens in one mushroom.<sup>28</sup>

In creating and using synthetic pesticides, human beings can control the amounts and kinds of pesticides that are used. When toxins are made naturally by the plants themselves, humans cannot control them very well.

Bruce Ames, a prominent biochemist at the University of California at Berkeley, and his colleague Lois Swirsky Gold point out that people ingest about ten thousand times more of these natural pesticides than synthetic ones!<sup>29</sup> The reason that these don't harm us, they explain, is that “the many layers of general defenses in humans and other animals protect against toxins, without distinguishing whether they are synthetic or natural.” These natural defenses can't tell whether toxins are plant-made or laboratory-made. They protect humans against both.

Bans on pesticides may actually have serious health consequences. An impressive array of studies indicates that fruits and vegetables reduce the risk of a number of cancers, and synthetic pesticides have made a major contribution to health by reducing the cost of producing fruits and vegetables.<sup>30</sup> Prohibiting the use of many chemicals is likely to decrease the supply and raise the price of fruits and vegetables. This will reduce the consumption of these healthful foods, especially by poor people.

### **Talking to Your Children**

Agricultural chemicals can benefit society as well as have bad consequences. That simple fact is often ignored in the textbooks. Here are some questions that you can answer.

- ◆ Do pesticides on our food cause cancer in humans?

This is very unlikely. While some scientists speculate that pesticide residues can increase our risk of cancer, Canadian cancer experts maintain that the public's fear of chemicals is "out of proportion to the risks."<sup>31</sup> Some pesticides have caused cancerous tumors in *animals*, but it is difficult to know if humans would react in similar ways. Also, those animals have usually been fed enormous quantities of the pesticides.

- ◆ What was wrong with DDT?

The buildup of DDT in the environment may have contributed to the serious decline in the numbers of birds such as falcons and eagles. However, the claim that DDT is a human carcinogen is not supported by the evidence.

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**Produce Prices: Grocery Stores versus Organic Food Stores**  
(price in \$CDN/lb)

	Grocery Stores		Organic Food Stores	
	Safeway	IGA	Capers	On Broadway Specialty Foods*
<b>Red Cabbage</b>	.49	.59	.99	.59
<b>Bananas</b>	.69	.69	1.49	1.19
<b>Russett Potatoes</b>	.59	.49	.99	.79
<b>Yellow Onions</b>	.39	.49	1.79	.79
<b>Golden Apples</b>	1.29	1.19	1.99	1.39
<b>MacIntosh Apples</b>	.79	.59	.99	1.19
<b>Romaine Lettuce</b>	.79	.69	1.39	.99

Source: September 25, 1997; Vancouver, British Columbia)

\* produce organic except lettuce

◆ Should we buy only organic food?

No. There is *no* reason to believe that organic food is safer than food grown and processed under the usual conditions. Naturally pest-resistant crops have their own powerful toxins. Health experts emphasize the importance of eating fruits and vegetables, and pesticides and herbicides help keep the costs of these foods low and the supply high. Organic foods are often more expensive than other foods, and this discourages people from eating them.

### **Activities for Parents and Children**

Here are some activities that will help put agricultural chemicals into perspective for your children.

#### ***At the Organic Food Store***

Take your children to an organic food store. Have them look at the fruits and vegetables, and record some of the prices. Then take them to a regular grocery store and have them look at the appearance of the same fruits and vegetables and record their prices. Discuss the differences in price and quality. They might find something like those in the table on page 238.

Explain to them that when farmers do not use pesticides, insects destroy more of the crop. This lowers the supply and causes prices to be higher. Also, since the quality is lower, demand for organic products is lower, and “organic” farmers cannot obtain the cost savings that come from producing large quantities.

If all fruits and vegetables were as expensive as those in the organic food stores, families, especially poor families, would be less able to afford them. Thus, these people would have poorer diets, which would contribute to many health problems. You could call the Canadian Cancer Society’s Cancer Information Service (1-888-939-3333) and ask for its booklet “Healthy Eating: Reducing Your Risk of Cancer.”

***At a Nursery or Garden Centre***

Take your children to a nursery or garden centre. Show them the various pesticides and herbicides. Ask them to read (or read to them) the safety instructions on the containers. These instructions are there to ensure that the products are used safely to protect both the person handling the chemicals and the environment. Explain to your children that many products are dangerous if used improperly, but, if used according to the instructions, the products are safe.

***Agricultural Progress***

The table on page 241 compares several characteristics of various countries. They show the extent to which these countries use modern farming methods, including tractors and fertilizers. Looking at the data, your children will see that there seems to be a connection between modern farming methods and longer life expectancy and higher incomes. Explain to your children that many factors influence income levels and life expectancy, but one important factor is the abundance of inexpensive food provided by modern agriculture.

**Notes**

- 1 Catherine Dee, ed., *Kid Heroes of the Environment* (Berkeley, CA: EarthWorks, 1991), 15–16.
- 2 Anne Pedersen, *The Kids' Environment Book: What's Awry and Why* (Santa Fe: John Muir, 1991), 80, 82.
- 3 Mary Metzger and Cinthya P. Whittaker, *This Planet is Mine: Teaching Environmental Awareness and Appreciation to Children* (New York: Fireside, 1991), 146.
- 4 Namowitz, Samuel N., and Nancy E Spaulding, *Heath Earth Science* (Toronto: D.C. Heath Canada, Canadian ed., 1987), 494.
- 5 Siebert, Myrtle, and Evelyn Kerr, *Food for Life*, (Toronto: McGraw-Hill Ryerson, 1994), 299.
- 6 Pedersen, 84, 86.

### Life Expectancy and Farming Methods

Country	Life Expectancy 1994	Tractors per Million Population	Million Tons of Fertilizer per Million Population	Annual per Capita Income 1991 (GNP in US\$)
Canada	78.5	30,819	82.0	21,260
Switzerland	78.5	17,703	26.2	33,510
Austria	76.5	46,518	39.7	20,380
United States	76.0	19,095	74.1	22,560
Denmark	76.0	31,724	123.7	23,660
Portugal	75.5	13,932	28.3	5,620
Chile	75.0	3,155	26.1	2,160
Bulgaria	73.5	5,934	80.2	1,840
Mexico	73.0	2,095	33.5	2,870
Argentina	71.5	7,264	5.9	2,780
Thailand	68.5	2,897	19.1	1,580
China	68.0	713	23.3	370
Iran	66.0	2,326	23.5	2,320
Peru	65.5	941	7.3	1,020
Philippines	65.5	176	9.7	740
Guatemala	64.5	694	21.8	930
Brazil	62.0	5,943	25.9	2,920
India	58.5	1,171	14.9	330
Bangladesh	55.0	60	10.7	220
Somalia	54.5	299	0.4	150
Kenya	53.0	463	5.4	340
Ethiopia	52.5	92	2.6	120
Haiti	45.0	43	0.2	370
Zimbabwe	42.0	2,703	22.7	620
Chad	41.0	51	1.8	220
Rwanda	40.0	19	0.6	260

Sources: Marlita Reddy, ed. *Statistical Abstract of the World* (New York: Gale Research, 1994), table 57 (tractors), 449; tables 58, 59, 60 (fertilizers), 457, 464, 471; and *Encyclopedic World Atlas* (New York: Oxford University Press, 1994), Per Capita Income in U.S. Dollars, V1, Life Expectancy, V3.

- 7 Environment Canada, *Understanding Pesticides*, 6.
- 8 National Research Council Committee on Comparative Toxicity of Naturally Occurring Carcinogens, *Carcinogens and Anticarcinogens in the Human Diet* (Washington, DC: National Academy Press, 1996), Executive Summary, 5.
- 9 Environment Canada, *Understanding Pesticides*, 1.
- 10 Thomas R. Dunlap, *DDT: Scientists, Citizens, and Public Policy* (Princeton, NJ: Princeton University Press, 1981), 59.
- 11 Harland Austin, Julian E. Keil, and Philip Cole, "A Prospective Follow-Up Study of Cancer Mortality in Relation to Serum DDT," *American Journal of Public Health*, Vol. 79, No. 1 (January 1989), 43.
- 12 Holly Lippke, *DDT: An Overview*, PERC Working Paper 93-3, Political Economy Research Center, Bozeman, MT, 1993.
- 13 J. Gordon Edwards, "DDT Effects on Bird Abundance and Reproduction," in *Rational Readings on Environmental Concerns*, ed. by Jay H. Lehr (New York: Van Nostrand Reinhold, 1992), 195-216, at 205.
- 14 Kenneth Mellanby, "With Safeguards, DDT Should Still Be Used," *Wall Street Journal*, September 12, 1989, A30.
- 15 M. B. Green, *Pesticides—Boon or Bane?* (Boulder, CO: Westview, 1976), 101.
- 16 Lippke, 11.
- 17 Michael Fumento, *Science Under Siege: Balancing Technology and the Environment* (New York: William Morrow and Company, Inc., 1993), 21-47.
- 18 Joseph D. Rosen, "The Death of Daminozide," in *Pesticides and Alternatives*, ed. by J. E. Casida (New York: Elsevier, 1990), 59.
- 19 Thomas Gale Moore, *Environmental Fundamentalism* (Stanford, CA: Hoover Institution, 1992), 6.
- 20 Richard Doll and Richard Peto, *The Causes of Cancer* (Oxford: Oxford University Press, 1986), 1245-1265.
- 21 Doll and Peto, 1250.

- 22 Bruce N. Ames and Lois Swirsky Gold, "Environmental Pollution and Cancer: Some Misconceptions," in *Rational Readings on Environmental Concerns*, ed. by Jay H. Lehr (New York: Van Nostrand Reinhold, 1992), 151–67.
- 23 Cancer Information Service, *Canadian Cancer Encyclopedia*, (Regina: Canadian Cancer Society, 1997), Site 907, pp. 1.
- 24 Bruce N. Ames and Lois Swirsky Gold, "Pesticides, Risk, and Applesauce," *Science*, May 19, 1989, 755–757.
- 25 Lois Swirsky Gold, et al., "Rodent Carcinogens: Setting Priorities," in *Science*, Vol. 258, October 9, 1992, 261–265, and Lois Swirsky Gold, Thomas H. Slone, and Bruce N. Ames, "Prioritization of Possible Carcinogenic Hazards in Food," in *Food Chemical Risk Analysis*, ed. by David Tennant (London: Chapman and Hall, 1997).
- 26 Ames and Gold, 756.
- 27 National Research Council Committee on Comparative Toxicity of Naturally Occurring Carcinogens, Executive Summary, 5–6.
- 28 *Understanding Pesticides*, 2.
- 29 Ames and Gold, 755.
- 30 Bruce N. Ames, Mark K. Shigenaga, and Tory M. Hagen, "Oxidants, Antioxidants, and the Degenerative Diseases of Aging," Proceedings of the National Academy of Sciences U.S.A., Vol. 90, September 1993, 7915–22.
- 31 Canadian Cancer Society, *Healthy Eating* (Toronto: Canadian Cancer Society, 1996), 3.