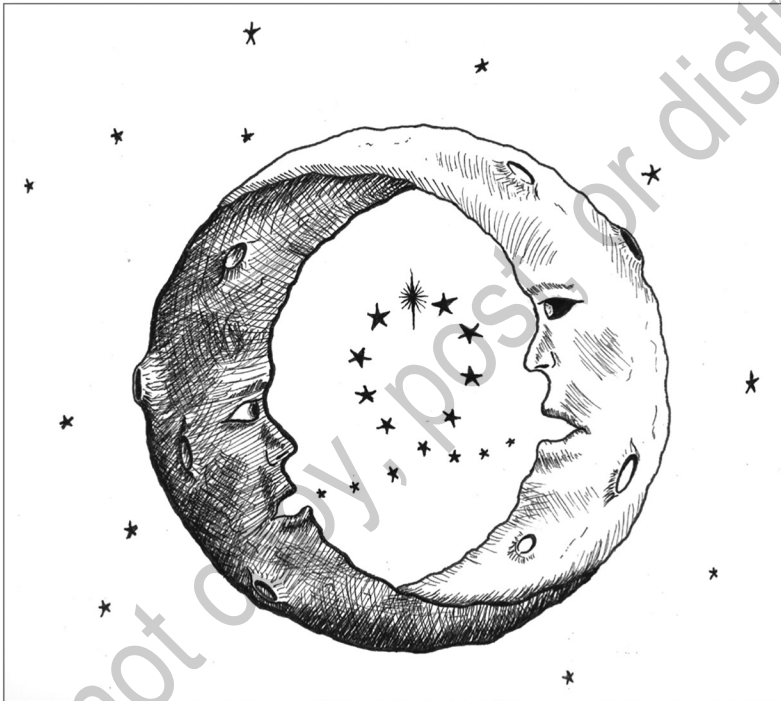
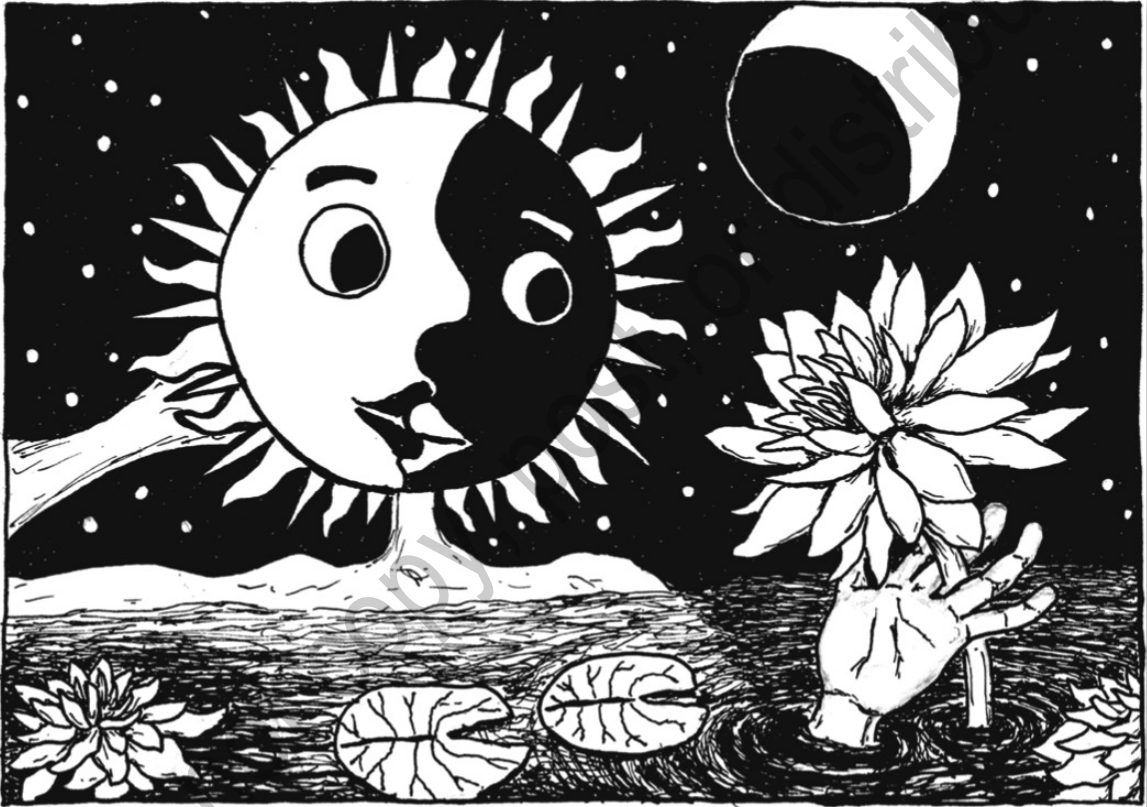


# The Material





## Health and Justice

December 2, 1984, was the date. The people who lived in the shadow of Union Carbide's pesticide plant in Bhopal, the capital of the Indian state of Madhya Pradesh, knew it wasn't the best place to call home. The main product of the Bhopal plant was the insecticide Sevin. One stage of making Sevin requires the production of methyl isocyanate (MIC), a highly toxic chemical related to the nerve gas phosgene, which has the unfortunate property of reacting strongly with a common substance: water. So it has to be handled with unusual care. Even moisture in the air can be a problem. MIC is not the kind of thing that recommends itself to people looking for an area in which to settle down and raise a family.

But the people of the Jaiprakash Nagar neighborhood, 100 yards from the plant, were poor and didn't have much choice in the matter. At least they had roofs over the heads of their families—if only tiny, ramshackle ones propped up by thin and shaky walls. As the residents drifted off to sleep that cool evening, the late-night voices of the neighborhood came filtering through those thin walls, as they did every night, a comforting music of place to those accustomed to it. Someone laughing in the distance. Someone comforting a crying baby. Someone rummaging around in the dark.<sup>1</sup>

On the other side of the chain-link fence separating the plant from the neighborhood, however, there was mounting panic. Production at the plant had been shut down for a month for maintenance. Workers were beginning the complex series of operations to get it up and running again. About 9:30 p.m., they started washing out a few lines with water downstream in the production process from the MIC storage area, which should have been safe enough. But there followed a whole series of troubles, individually minor and collectively disastrous. A clogged valve. A line left open. A few standard safety procedures not followed. A dysfunctional safety mechanism—a broken burner that was supposed to scrub any gases venting from the system. A poorly thought-out modification of the plant's initial design that, in fact, connected the MIC storage area with the lines the workers were washing out. A recent reduction in the size of the work crew from twelve to six. An inexperienced supervisor.

The last may have been the most crucial. Around 11:30 p.m., workers detected an MIC leak in the way they usually did: a burning in their eyes and throats. (This was far from the first MIC leak the plant had had. Although Union Carbide claimed that the Bhopal plant was the twin of a trouble-free one in West Virginia, it had been built without several of the safety features of its supposed twin.) The workers reported the problem to the supervisor, who shortly called a tea break, with plans to attend to the leak afterward, once fortified with caffeine. By 12:30 a.m. (now on December 3), the

reaction of MIC with water became too much for the system to contain. A major leak began as MIC from tank E610 started to rush past the dysfunctional burner and out into the atmosphere above the plant. At 12:40 a.m., burning eyes and throats ended the tea break. At 12:50 a.m., workers pulled a general alarm at the plant when they discovered they were unable to get the burner working. At 2:00 a.m., the leak petered out as tank E610 reached empty. At 2:15 a.m., workers pulled the alarm siren and walked over to a nearby police control room to report that the “leak has been plugged” and to give the first public admission that there had been a leak at all.<sup>2</sup>

By then, thousands had already died. In the coming hours, days, and years, thousands more would die. Some 5,000 to 20,000 in all would lose their lives, including a quarter of the residents of Jaiprakash Nagar and two other shantytown neighborhoods close to the plant. Some say 30,000 died.<sup>3</sup> No one knows for sure how many.<sup>4</sup> The residents of the worst affected neighborhoods were not the sort of people whose troubles the local government pays much attention to or who take their troubles (including their dead) to the government for help. Many died in their sleep, and there may have been some luck in that. Others awoke, breathless, coughing, with burning sensations, vomiting blood and frothing at the mouth, and rushed out of their homes in agony, right into the depths of the chemical fog, before collapsing in the street. Tens of thousands of cattle died as well. The stench of death was everywhere. At least another 500,000 people were injured.<sup>5</sup>

Here are some reports from the local papers the next day:<sup>6</sup>

Jaiprakash Nagar, a sleepy locality of Old Bhopal, is today a ghost colony. Every second house in the locality has lost at least one family member in yesterday's night of horror.

This correspondent who went round the locality early morning found more than fifty dead bodies lying unattended and unnoticed. . . . The dead included mostly children below ten years of age.

The scene was so gruesome that it was difficult for survivors to identify their own dead family members. The neighbors were not willing to tell anything to anybody. They just sat glassy eyed, dumb-founded.

The tragedy continues today among the survivors. Numbness. Trembling. Polluted breast milk. Monstrous birth defects. Memory problems. Breathing problems. Immune system problems. Psychological problems. “Thirty-five years we have suffered through this,” said Omwati Yadav, 67, in an interview with *The Guardian* on the anniversary of the disaster. “Please just let it end. This is not life, this is not death, we are in the terrible place in between.”<sup>7</sup> It turned out that Union Carbide had been dumping large quantities of toxic waste on the site for years, polluting the land and the water below. Cleanup efforts are ostensibly underway, but those who live in what is called “old Bhopal” continue to drink contaminated water.<sup>8</sup>

Survivors are still struggling for some recognition through compensation (see Figure 2.1), and there have been many worldwide hunger strikes on their behalf, most recently in 2019. In 1989, Union Carbide did offer a \$470

million settlement. As this amounted to less than \$1,000 per victim, survivors were furious and demanded much more. The corporate veil—which we will talk about more in Chapter 4—helps shield investors, not just Union Carbide, from liability.<sup>9</sup> The veil thickened when, in February 2001, Union Carbide merged with Dow Chemical Company. Dow claimed that because the accident took place before the acquisition, the company had no liability in regard to what happened. Dow reiterated this claim when it merged with DuPont in 2017, prompting the UN’s special rapporteur on hazardous substances and wastes to warn “This merger creates yet another layer of legal hurdles for victims to arrive at any semblance of an effective remedy and accountability for a preventable disaster now more than 30 years old.”<sup>10</sup>

The Indian government repeatedly requested the extradition of Warren Anderson, Union Carbide’s CEO at the time of the accident, to face trial for culpable homicide, but the United States never complied. Indeed, in August 2010, the U.S. State Department declared the Bhopal case “closed,” and on September 29, 2014, Anderson died at age 92 in Vero Beach, Florida.<sup>11</sup> In June 2010, seven Indian former executives of Union Carbide’s Indian subsidiary were sentenced to two years in jail each and paid a \$2,100 fine, although they were later released on bail pending appeal.<sup>12</sup> A 2011 request to reopen the case was denied by the Indian Supreme Court.

A three-week hunger strike by Bhopal survivors in November 2014 finally resulted in the Indian government agreeing to an additional 100,000 rupees of compensation for each victim. Bhopal activists called it a “historical

Figure 2.1 Victims of the Bhopal Gas Leak Protesting Against Union Carbide on the Twentieth Anniversary of the December, 2, 1984, Disaster That Killed Thousands and Injured Over Half a Million



Source: Emmanuel Dunand.

victory,” and it was, given how the Indian and U.S. governments and the Union Carbide company successfully resisted their efforts for so long.<sup>13</sup> But 100,000 rupees equals only about \$1,600. It means that combined with the earlier settlement, Bhopal’s survivors received a sum total of \$2,600 compensation for such horror. To make matters worse, the U.S. government has thrown out several class action lawsuits and refused to pass on criminal summons as recently as 2019.<sup>14</sup>

Enough. We know this is a grueling story to read about. We know because it was grueling to write about. But we tell it to remind us in a forceful way of a central implication of environmental questions: How do our bodies fold into the environment around us, with the health of one tied into the health of all? As Eric Klinenberg noted with regard to the hundreds of deaths in the Chicago heat wave of 1995, “We have collectively created the conditions that made it possible for so many . . . to die.”<sup>15</sup> In other words, the tragedy of Bhopal was a social tragedy as much as anything else, patterned by factors we will explore throughout this book: the patterns of our economy, the patterns of our technology, the patterns of our politics, the patterns of our distribution of environmental goods and environmental bads.

As we write, the conjunction of the COVID-19 pandemic, a deep recession, and the Black Lives Matter protests in response to the police murder of George Floyd reinforces our recognition of both the interactiveness and injustices of the world that we are all a part of, not apart from. When we recognize that the justice of our personal body is intertwined with the justice of others—and that human health cannot be decoupled from that of the many species around us—we begin to think about the mutual aid we can provide rather than imagining one’s bodily survival set against the world around. We strive not against each other but for *one justice* that ties the injustices of each into the injustices of the many—into their consequences for the biggest community of all. Rather than competitive survival of the fittest, we think about our lives as *one in all and all in one*.

True, the Bhopal tragedy is one of the worst industrial accidents ever, with maybe only Chernobyl as a rival. But it’s all too easy to think of this as an isolated event, a disaster of the past that no longer ties into our future. Similarly, we thought of the “Spanish flu” of 1918–1919 that way too, and we were taken largely by surprise by the sweeping consequences of COVID-19. The biggest community of all reminds us that what seems of one—one person or one event—can have lingering repercussions for all across the three dimensions of environmental justice: time, social space, and species (see Figure 2.2). MIC did not know the boundaries of a factory’s fence but carried across space and time. COVID-19 does not respect the boundaries of cell walls, spreading from species to species and person to person—with striking inequalities in its impacts. Racism is part of the pandemic, both through vulnerabilities in who gets exposed and who has good health care, which perpetuates the virus and further endangers everyone. The health of one is the health of all.

Ecology, recall from Chapter 1, is the study of natural communities. But literally it is the study of *ecos*, which is ancient Greek for “home.” Ecology is thus the study of natural home as community. A body is an abode, too. As we will discover—perhaps surprisingly, given its constitution of each of us as individuals—a body, too, is an abode we share with everyone.

Figure 2.2 The Three Intersecting Axes of One Justice, Illustrating the One-in-All, All-in-One Relationship Across Time, Social Space, and Species



## The Material Basis of the Human Condition

We have bodies. We need to eat, we need shelter, and we generally need some kind of clothing. Certain material inputs and outputs are essential to all living bodies, which means that no body can exist without material interaction with its environment. As Karl Marx, the still-controversial nineteenth-century philosopher, observed, “The mode of production of material life conditions the social, political and intellectual life process in general.”<sup>16</sup> In other words, there are many ways that societies can arrange material production from the environment, and these arrangements have great consequences for how we live, even how we think. Our ecology is our economy, and our economy is our society.

Or as Madonna Louise Ciccone, that still-controversial twentieth-century sage, put it, “We are living in a material world.”

## Ecological Dialogue

But we must be wary of the simplistic clarity of a purely materialist perspective. *Material* factors always depend upon *ideal* factors. The converse is equally true. Our ideals are shaped by the material conditions of our lives, and our material conditions are shaped by our ideals. You can only do what

you can do. But what you can do, and what you *do* do, is as much a matter of what you know, believe, and value—all ideal factors—as it is a matter of what your material, bodily circumstances are. Moreover, what your material circumstances are depends in large measure on what you know, believe, and value. If you don't know about germs, you are far more likely to do things that leave you and others vulnerable to their effects and to have different cultural values of cleanliness—like not maintaining proper distancing from others during a pandemic. And what you know, believe, and value depend on your material circumstances. If you live in the Arctic, you are likely to know quite a bit about ice and snow and probably will value it as more than a source of occasional recreation. It's a dialogue—a constant interplay of factors that condition and influence each other, a never-ending conversation between the material and ideal dimensions of social life.<sup>17</sup> The more we engage in this dialogue, the more we can begin to forge social ecological ties that move us toward one justice.

The concept of dialogue provides an alternative to the mechanical, hammer-and-nails notion of causality that the social sciences for many years attempted to borrow from that ultimate materialist science, physics. In social life, causality is rarely, if ever, a one-way street, and material conditions are rarely, if ever, all that is involved. In fact, mechanical materialism probably isn't even good physics, as physicists themselves now argue, due to the complexity of the universe.<sup>18</sup> Contemporary ecologists make related arguments about the way mechanical thinking gives us a dangerously reductionist image of the world as a series of parts, ticking one into the other. Rather than a mechanical realm of linear causes and effects, the more ecological view is that all life—not just social life—is an interactive phenomenon in which causes cause effects and effects effect causes, blurring the boundary between them. When we call something in social life a “cause” or an “effect,” we are intellectually, and artificially, arresting this constant interplay for a moment. A material cause or effect and an ideal cause or effect are mere intellectual “moments” in the endless ecological dialogue (see Figure 1.1 in Chapter 1).

An interactive understanding of causality is also a more open one. Materialist analyses like conventional science's mechanical reductionism, as well as some of the materialist social theories this section of the book discusses, tend to be deterministic. In this view, the world is what it is because of what it is. What happened is what could happen. It's all the product of the ticking of the materialist clock. But a dialogic view imagines that, as Arthur Koestler put it, “Neither parts nor wholes exist in an absolute sense.”<sup>19</sup> There are no little gears that we can pop out of the clock to inspect, each on its own, nor a clock that we can stand back and admire as a whole. Parts are part of other parts; wholes are part of other wholes. Each is the other, one in all and all in one. And there is much jumble and tumble everywhere, confusion and conflict. The world isn't all worked out and neatly put together. Life isn't determined; rather, it is constantly de-terminated, un-ended, made anew from the surprising consequences of interactivity.

Think of it like the feeling of wonder that we sometimes come away with after a good conversation—a sense of something new and unanticipated that leaves us changed and invigorated.<sup>20</sup> The dialogue of ecology is like that, at least potentially—full of moments of creativity and unpredictability. This constant capacity for re-ordering and de-ordering, which stems from the



interactiveness of that which is always at least partially un-ordered, is what dialogics terms *unfinalizability*.

Environmental sociology does have to enter the dialogue somewhere, though. To be able to understand the interactiveness of the world, you have to be able to distinguish that which is interacting. To understand connection, overlap, and mutual constitution, you must be able to see *difference*. Otherwise there will be nothing to connect, overlap, and mutually constitute. The same can be said of disconnection, for not everything is, nor perhaps should be, connected. (At least, Mike, Loka, Laura, and Ike report that they are happy to be disconnected from the smallpox virus and, at least thus far, from COVID-19—although some of their friends and relatives have not been so lucky.) Disconnection, too, depends on imagining difference. In this part of the book, we enter the ecological dialogue from the material side of things. In the next part, we will enter from the ideal side. Although we enter the dialogue from these different sides, these different moments, in each chapter we will be inevitably drawn over from the material to the ideal and from the ideal back to the material. Through this dialogue we can learn how to better forge ties across the gaps in mutual aid that impede environmental justice. But we have to start somewhere if we are to get to the real goal, the last section of the book: the practical.

## One Health

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It may come as a surprise to learn that the body and health have not always had an easy and welcome place within our dialogues about ecology. Indeed, the human body and health have often been understood as diametrically opposed to the concerns of environmentalism.

Take health. Why do we alter the environment by draining swamps, dousing our crops with pesticides, and burning fossil fuels? To eliminate the habitat for insects that carry disease. To compete better against weeds and other pests for food, that essential substance of health. To make our lives less grindingly arduous through heating, cooling, lighting, and mechanized transportation. Seen from this view, the environment seems a threat to human health, not an aspect of it. Thus, concerns for public health, for eliminating hunger, and for human comfort have often promoted transformations of the environment, on behalf of our bodies, that run afoul of at least some conceptions of environmental justice. Historically, the public health movement and efforts to end hunger have had surprisingly little to do with the environmental movement. Although efforts to clean air, water, and land of pollution are certainly central environmental concerns, they have often taken a rhetorical backseat to efforts like wilderness and biodiversity protection. Many proponents of efforts to improve human comfort have long regarded the environment as something of an enemy.

And then take the body. The very meaning of the word *environment* has a connotation of what is around us. The environment is our environs, our ecological neighborhood, not us. Each of us, as one human, seems apart from the rest of the world, quite far from a concept of one in all and all in one. Lurking inside the opposition of ourselves to the environment may be something of a disgust for our bodies, at least in the minds of some. If you think through what it takes to maintain a body as an ongoing entity, you

are pretty much inevitably led to our links to the environment and thus to the recognition that we are not unlike animals with animal needs. By keeping the body conceptually separate from the environment, perhaps we are unconsciously trying to ignore this “low” reality of human life—a reality we may find embarrassing.<sup>21</sup>

To help that lessen that separation, we have a little term to offer, one that Mike and his Dutch colleague Kris van Koppen came up with some years ago.<sup>22</sup> We could continue using the terms *body* and *environment*, as traditionally has been done in the West, and try constantly to remind ourselves not to regard them as oppositional. But by establishing an initial separation, these terms force us to undertake an extra intellectual step to recognize their interconnections, their dialogue. So rather than always speaking of the body and the environment, it might help sometimes to speak of the *invironment* and the *environment*—where the *invironment* refers to the inner zone of the environment, where we find the body in perpetual dialogue with the environment. Environmental issues, then, would be issues that concern the dynamics of that inner zone of dialogue, with health being perhaps the prime example. The dialogue between the environment and the *invironment* shapes much of life as we know it because what is of the inside is also of the outside.

In the usage we’re suggesting, then, *environment* is a more encompassing term than *invironment*. Some environmental issues—like climate change or species loss—are not, at first glance, human *invironmental* issues. But as we consider environmental issues more closely, we will likely discover that they all have *invironmental* dimensions. Climate change has implications for food production, for water supplies, for nonhuman and human disease, and more, including the sheer level of warmth with which our bodies must contend in the summer. Species loss has implications for the loss of potential medicines and crop varieties that might help relieve concerns for human health and hunger—not to mention the *invironment* of the nonhuman animals who are losing habitat, being hunted, or facing competition from recent migrants to their ecological niches (more on that soon). In sum, the environment is not only something “out there.” It is also something “in here.”

### Invironments of Food: Feeders and Eaters

Consider eating. What is that substance there on your plate? Food, yes: something nourishing that you soon intend to put into your mouth and then to swallow deeper within and later disperse throughout your body. Some of it will pass through—perhaps rather quickly, if we may say so. But some of it will stay awhile in one form or another, perhaps even for the rest of your life. If you are what you eat, that is your future body there beneath your fork.

But that substance is also a lot more than that. It is ecology in motion, moving to you and soon to move through you. You may be thinking about it as a simple, light lunch: pasta tossed with olive oil, a crushed garlic clove, sautéed mushrooms, some grated cheese, and a bit of pepper and basil. But it likely contains atoms from the soil, air, and water of many continents, assembled into tasty unions by plants and sunlight in interaction with bacteria, fungi, and animals.

The wheat in the pasta probably didn't come from anywhere near you. Pasta makers favor an especially hardy variety of wheat with a double load of chromosomes called durum wheat, which doesn't like a lot of rain. Farmers grow a lot of it in North Dakota, Saskatchewan, Spain, northern Italy, Turkey, Syria, northwestern Africa, India, Australia, and a few other places. But durum wheat dries well, stores well, and pours well into containers and thus is fairly easy to send flowing throughout the world, including to you.

Unless you are lucky enough to live in a Mediterranean climate, the olives that yielded the olive oil probably didn't grow near you either. Olive trees like their summers hot and dry and their winters mild and wet. But olive oil also stores well and pours well and is easy to send flowing from afar—probably from California or a Mediterranean country.

If that's black pepper on your pasta, it assuredly came from a tropical country, most likely Vietnam, currently the world's leading exporter. So if you're from higher latitudes and western longitudes, that likely represents yet another continent on your plate.

If you are having lunch at Mike's house, though, everything else could have come from much closer by, including his own backyard in Wisconsin. He doesn't grow mushrooms at home, but lots of farmers in Wisconsin do—which is nice, because he likes mushrooms even though they are fairly perishable and hard to grow. Mushrooms aren't like wheat. They store badly and pour badly. Local is definitely better with mushrooms. Mike doesn't have a cow either, but Wisconsin sure has a lot of dairy farms, so getting the cheese is not a worry. It's probably not a worry for you either, even if you don't live in Wisconsin, California, France, Britain, Italy, or Switzerland. Milk pours well but stores badly. Cheese pours badly but fortunately stores pretty well, and it's packable enough to make up for bad pouring—as long as you can charge a good amount for it. So one can often find tangy bits of Wisconsin in much of the world. But the garlic and the basil came from Mike's own vegetable garden, 30 feet away. And if instead of black pepper that's red pepper on your pasta, some years Mike grows that at home, too.

Quite conceivably you have on the plate before you durum wheat from Australia; olive oil from Italy; black pepper from Vietnam; and cheese, mushrooms, basil, and garlic from Wisconsin, the latter two from Mike's backyard. And maybe you'd finish up with some chocolate blended from varieties grown in Africa and South America, as is often the case with fine chocolate. That would be six of the seven continents. (Not much grows in Antarctica.) That would also be four of the six kingdoms of life: cheese from animals and eubacteria; wheat, olive oil, basil, garlic, and pepper from plants; and mushrooms from the fungi. (Humans do not, as yet, cultivate archaeobacteria for food. In some cuisines, there are some protists, mainly in the form of algae, as in the nori in sushi, but humans don't eat a lot of protists either.)

That's a lot of ecology, or what we suggested in Chapter 1 we should call "social ecology." You are thus an intersection point in a vast flowage of social relations made ecological and ecological relations made social. In that sense, you eat what you are.

You eat what you are in another sense, too. What we eat is more than merely material. Our food also embodies social relations. Our sense of identity suffuses what we judge as worth eating. Don't like cheese? Then you are probably from a nondairy culture, like most of China, where cheese can

seem as alien as tofu can feel to others. Don't care for garlic or pasta? Then perhaps you are the Queen of England, who is said to regard these as foreign intrusions on British culture. Absolutely adore that cake or stew recipe that has been handed down from generations of family members? And do you adore it, if truth be told, in part because you know these recipes are family traditions? Then you are like everyone else who enjoys what food scholars have termed *memory dishes*, which invoke *food ghosts*—that is, the presence in food of those who are not physically there and give meaning to what we eat.<sup>23</sup>

And then there's the intersection of the way we produce and process food with the conditions of the animals and plants that provide it. Here's a sampling of U.S. headlines in late 2019: "Popular BBQ restaurant closed due to Salmonella outbreak" (a dozen people sickened in North Carolina),<sup>24</sup> "New avian flu virus suspected in Taiwan's poultry" (four new outbreaks confirmed in the previous two weeks),<sup>25</sup> "Is chronic wasting disease in deer dangerous for humans?" (hunters in Wisconsin, like Laura's husband, now required to test venison before human consumption).<sup>26</sup> *Salmonella*, avian flu, coronavirus, and chronic wasting disease are all examples of zoonotic diseases—those that are shared between animals and people and thus affect both human and nonhuman bodies. Zoonotic diseases are a common and growing public health concern. According to the U.S. Centers for Disease Control and Prevention, 60 percent of known infectious diseases and 75 percent of new or emerging infectious diseases in people are spread from animals.<sup>27</sup> COVID-19 is likely one of many such zoonotic diseases, albeit an especially virulent and transmissible one. Zoonotic diseases are especially critical in *hotspots*, or places like Kibale National Park in Uganda and the Okavango Delta in Botswana, that experience elevated infectious disease emergence, incidence, and transmission.<sup>28</sup> And the risk goes both ways: The majority of new or emerging diseases in wildlife are linked to human activity, too.<sup>29</sup>

Even before COVID-19, zoonotic diseases were gaining a lot more attention as high-profile outbreaks sent officials scrambling for new strategies to monitor and address threats. In the wake of the 2003 avian flu crisis, international agencies like the World Health Organization (WHO), Food and Agriculture Organization (FAO), World Organization for Animal Health, and the World Bank began collaborating to develop and promote an approach called *one health*.<sup>30</sup> This strategy seeks "to improve health and well-being through the prevention of risks and the mitigation of effects of crises that originate at the interface between humans, animals, and their various environments."<sup>31</sup> In other words, one health is a way to think about how the well-being of humans, animals, and the environment are inextricably intertwined. It's a way to build the ties necessary for one justice, a justice for all in all.

Applying a one health framework, for example, illuminates how socioeconomic processes affect the emergence and spread of zoonotic disease. Globalization entails the expansion of international trade and travel that facilitates the rapid transmission of pathogens from humans and animals in one part of the world to animals and humans in another. For example, a recent study of food products of animal origin illegally imported into the European Union found that 5 percent contained *Listeria monocytogenes*

pathogens, which can cause miscarriage or premature delivery.<sup>32</sup> Urbanization without adequate resources for sanitation, housing, and essential services is one reason why dense West African cities like Monrovia, Liberia, and Freetown, Sierra Leone, were “fertile ground”<sup>33</sup> for the Ebola virus during the 2014–2015 outbreak that claimed more than 11,000 human lives.<sup>34</sup> New settlements and farming infrastructure can change patterns of human contact with domestic and wild animals. It turns out that building hydroelectric dams and irrigation canals on the Tana River in Kenya was good news for farmers seeking year-round water access—and even better news for mosquitos carrying Rift Valley Fever and malaria, which like to breed in stagnant water.<sup>35</sup>

These types of socioeconomic processes, of course, also have environmental dimensions. Growing human demand for food and natural resources alters land use patterns in ways that can seriously damage ecological systems and make all beings more vulnerable to illness. It doesn't have to, as shown by agroecology—methods of farming across time, social space, and species that are often called “sustainable” or “regenerative” agricultural practices. Still, more destructive approaches to food production continue to largely prevail. Deforestation has destroyed swaths of biodiverse habitats in the Amazon and altered hydrological cycles to expand the range of malaria-carrying mosquitos.<sup>36</sup> Intensive agriculture like Concentrated Animal Feeding Operations (CAFOs) confine animals pumped full of antibiotics and ratchet up the power of “superbugs” that can spill over across species.<sup>37</sup> In North Carolina, hogs housed by the thousands in such facilities “chew maniacally on bars and chains, as foraging animals do when denied straw.” A combination of “antibiotics, hormones, and laxatives” keep animals alive where the air burns with ammonia, the floor is covered with feces, and manure pools up in vast artificial “lagoons” that regularly overflow or collapse, sending millions of gallons of waste into nearby rivers and streams (see Figure 2.3).<sup>38</sup> For example, after Hurricane Florence in 2018, lagoons on 110 North Carolina farms overflowed due to excess rain.<sup>39</sup>

Hog processing is on a similar inhumane and massive scale, folding the health risks of animals into the health risks of humans. Immigrant workers at Quality Pork Processors Inc., a subsidiary of Hormel Foods, ran a device called the brain machine, where workers “sliced off the ears, clipped the snouts, chiseled the cheek meat . . . scooped out the eyes, carved out the tongues, and scraped the palate meat from the roofs of the mouths.”<sup>40</sup> Liquid brains became a thickener for stir-fry. After years of handling this part of the assembly line, some workers developed an autoimmune disorder that neurologists still cannot quite identify but has left them in wheelchairs, as their limbs stopped responding. And, as COVID-19 has demonstrated, workers packed together in meat processing plants can all too easily spread disease to each other, infecting hundreds, often with strongly racialized disparities in who gets exposed.<sup>41</sup>

Such social ecological wretchedness—yet dare we say that amid all this shared misery, there also lies an opportunity for recovering ecological beauty? The one health approach highlights the “global and inter-species sharing of health concerns and interests.”<sup>42</sup> The framework's widespread adoption in the past decade has encouraged policy makers, researchers, and global development organizations to take a more holistic view of public health.

Figure 2.3 The Manure Lagoons Associated With a CAFO



Source: Jevtic.

**These lagoons often overflow or even collapse, sometimes resulting in massive water pollution incidents.**

It has facilitated novel interdisciplinary and interagency collaboration to address outbreaks of zoonotic disease.<sup>43</sup> In a sense, the one health framework has also popularized the core insight of environmental justice: Humans truly are part of community in the largest possible sense across time, social space, and species.

But the concept of one health is not without its limitations. Despite aspirations to bring together local knowledge and expertise from different fields, interventions and studies taking a one health approach have been largely technocratic and siloed. The framework has helped channel international attention and resources to outbreaks of zoonotic diseases that threaten the Global North more frequently than to initiatives that could alleviate the disproportionate burden of endemic zoonotic diseases on the Global South.<sup>44</sup> Within the United States, researchers know that the conditions of CAFOs facilitate the ready transfer of pandemic viruses between species, but getting on site to stop or fully understand such processes continues to be stymied by powerful agribusiness interests. The sometimes anthropocentric focus of one health is in part to blame, where animals and the environmental are seen as part of the “supportive infrastructure” for human health rather than recognizing the intrinsic value of all life.<sup>45</sup> Taken together, the study of zoonotic disease is at risk of affording far too much attention to the rare and too little attention to the sometimes depressingly mundane issues of justice, as issues of inequality are fundamental to issues of disease.

We offer the concept of one justice to build on the vital insight of one health about the interactiveness of life while making questions of the

three dimensions of environmental justice—across time, social space, and species—central to our recognition that we are each in the other.<sup>46</sup>

## The Spirit of Water

“Where I come from I am fortunate as I can still drink water from the lake,” fourteen-year-old Autumn Peltier said, as she represented the Wikwemikong First Nation before the UN General Assembly in 2018, advocating for the launch of the International Decade for Action on Water for Sustainable Development. “But sometimes I question it. Not far from where I live there are communities that have lived through boil water advisories. I ask myself, why is it this way, and why in my province, why in my country?”<sup>47</sup>

Like for Autumn, water contamination came as a shock for LeeAnne Walters, who first became concerned about the water in Flint, Michigan, after her young twins developed rashes and clumps of her own hair started falling out in the shower. She began asking questions that eventually led to the uncovering of one of the most acute and widely publicized water contamination crises in the United States.<sup>48</sup>

Flint’s water crisis was decades in the making, a story of deindustrialization, structural racism, fiscal crisis, and state mismanagement that’s far too complex to fully recount here.<sup>49</sup> But suffice it to say that Flint residents experienced injustice long before they made national headlines. Following years of population loss that depleted the city’s tax base, Michigan governor Rick Snyder declared Flint in financial emergency in 2011 and appointed the first of several emergency managers with the authority to supersede local elected officials to address the city’s budget shortfall.<sup>50</sup> Flint’s municipal water system was a prime target for these state-sanctioned austerity measures.

In April 2014, then-emergency manager Darnell Earley switched Flint’s water source from Detroit’s water system to the Flint River to save money.<sup>51</sup> “The first time we heard that they were thinking of switching to the Flint River, we laughed, we thought it was a joke,” said Melissa Mays, a Flint resident-turned-activist.<sup>52</sup> “Because there’s a ton of cars in there, shopping carts, and we knew that industry had dumped in the river for a hundred years and didn’t clean it up.” Indeed, the Flint River carried much industrial history in it. General Motors was founded in Flint, where it produced Buicks and Chevrolets. Officials should have anticipated the multiple sources of waste flowing through the river because the city itself even discharged sewage into it. Despite all this, they failed to use a \$100-a-day additive to stop lead corrosion in the pipes. All precautions set aside, they saw the dollar as the bottom line in a city where 54 percent of residents are Black and 41 percent live in poverty.<sup>53</sup>

It didn’t take long for these shortsighted decisions to catch up with the city. Flint’s water tested positive for *E.coli* bacteria that summer, indicating the system was contaminated.<sup>54</sup> But rather than responding in accordance with the federal Clean Water Act, local officials simply issued a local boil advisory and added more chlorine. This boosted levels of trihalomethanes (TTHM), a toxic by-product produced by a reaction between disinfectants and organic compounds that increases the risk of pipe corrosion.<sup>55</sup> The city also neglected to investigate concerns that lead, which poses especially dangerous health risks to children, was leaching into the water as a result.<sup>56</sup>

General Motors switched back to Detroit water in October 2014 because water from the Flint River was corroding its products.<sup>57</sup> The Flint Water Advisory Task Force later documented that local officials were emailing about reports indicating that Flint's city water was contaminated with dangerous chemicals and heavy metals less than six months later.<sup>58</sup> Yet they continued to insist the water was safe for residents to drink.

LeeAnne Walters was convinced that something was amiss. By this point her eyelashes had fallen out and her fourteen-year-old son was so sick that he missed a month of school.<sup>59</sup> She continued pushing until she pierced through layers of bureaucracy to get the attention of Miguel Del Toral with the EPA, the federal agency charged with protecting human and environmental health. Del Toral was appalled by government inaction. Despite criticism from colleagues, he proceeded—sometimes on his own dime—to investigate. “Sorry for the rant,” he wrote in an email at the time, “but I am really getting tired of the bad actors being ignored, and people trying to do the right thing are constantly being subjected to intense scrutiny as if we were doing something wrong.”<sup>60</sup> In summer 2015, Del Toral's internal memo arguing that high levels of TTHM could cause lead and copper and other heavy metals to leach from the pipes was leaked to the public.<sup>61</sup>

Shortly thereafter, Walters and other citizen scientists helped bring a research team led by Virginia Tech engineering professor Marc Edwards to town. They confirmed dangerously high levels of lead in Flint's water. According to the U.S. Centers for Disease Control and Prevention, no level of lead is safe for young children, and levels of 5 parts per billion (ppb) or more constitute grounds for public health action.<sup>62</sup> In early September 2015, Edwards's team published results on 252 sample kits from Flint. Forty percent contained lead greater than 5 ppb, and several samples were greater than 100 ppb.<sup>63</sup> As the researchers wrote, “Mathematically, even if the remaining 48 samples returned have non-detectable lead . . . FLINT HAS A VERY SERIOUS LEAD IN WATER PROBLEM.”<sup>64</sup> On September 24, Flint pediatrician Mona Hanna-Attisha also reported an alarming increase in local children's blood lead levels after the switch to Flint River water (see Figure 2.4).<sup>65</sup> The county health department declared a public health emergency on October 1, and Flint switched back to the Detroit water system two weeks later. By this point, however, the pipes and plumbing were so corroded that they continued releasing lead. By January 2016, the Flint mayor, Michigan governor, and President Obama had all declared a state of emergency.<sup>66</sup>

The state finally set up distribution points for water filters and bottled water—not exactly what Chapter 1 called “normal environmentalism” though. Safe drinking water remained inadequate and inaccessible for many residents.<sup>67</sup> The state limited how much bottled water households could take home each day, and most distribution points were open from only noon to 6 p.m. This meant that the one in five households without a car—and anyone who had to work during the day—had to scramble for their daily ration or simply do without. The city provided a filter to every household but not training to maintain and install them.

These were hardly long-term solutions. So in partnership with the Natural Resources Defense Council (NRDC), a resident group called the Coalition for Clean Water filed a lawsuit demanding that state and city officials replace the lead pipes. On November 10, 2016, the court



Figure 2.4 A Five-Year-Old Child in Flint, Michigan, Cries as She Is Tested for Lead Poisoning on January 26, 2016



Source: Corbis.

ordered that the city provide home water delivery and filter installation while the case was pending. NRDC reached a settlement the following March. City and state officials agreed to replace 18,000 lead and galvanized steel pipes by 2020 at a cost of up to \$97 million.<sup>68</sup> They also agreed to ensure that every resident had a properly installed tap water filter in the meantime.<sup>69</sup> Flint's FAST Start program began removing lead pipes in April 2017. At the time of this writing, residents were still advised to avoid public water, but the city was on track to reach its goal of replacing all lead service lines by 2020.<sup>70</sup> If Flint's Lead-Free Initiative is successful, the city will become only one of a handful of municipalities to replace all lead service lines in the United States.<sup>71</sup>

Flint is no doubt a case study of environmental injustice. Researchers estimate that at least 140,000 people were exposed to dangerously high lead levels in Flint's water between April 25, 2014, and October 15, 2015.<sup>72</sup> The majority of these people were poor residents of color. Yet Flint also shows that even the privileged cannot escape the connective ties of contamination because the matters of one's exposure leaches like lead into a matter for all. Individuals who worked or attended daycare in Flint during the crisis were also affected, including those who lived in neighboring communities or had the resources to move away. In places like Milwaukee, Wisconsin, and Albany, New York, rich and poor alike are also grappling with how to deal with the threat. Local people can try to isolate themselves from these risks by purchasing private water systems or bottled water, enacting what sociologist Andrew Szasz calls an "inverted quarantine."<sup>73</sup> But even so, one can't fully avoid the consequences of high lead levels.

Then there's the matter of liability. Certainly, the legal system favors corporations, as we talked about in the case of Bhopal. But it can also sometimes hold actors accountable for wrongdoing. In terms of the Flint water crisis, a number of institutions have faced lawsuits: the federal Environmental Protection Agency (EPA); the engineering firms Lockwood, Andrews and Newman, and Veolia; the State of Michigan; the City of Flint; and the Michigan Department of Environmental Quality. The basic premises of the suits include "violating Flint citizens' 'right to bodily integrity' as protected under the 14<sup>th</sup> Amendment" and that "Flint's African American residents were denied equal protection under the law."<sup>74</sup> As of June 2019, fifteen state and local officials had also been charged with criminal wrongdoing—seven of whom pleaded no contest. But accountability is complicated. In June, the state attorney general abruptly dropped charges against the eight individuals awaiting trial, claiming the investigation had been botched and needed to start over. Although they left open the possibility of filing new charges, none had been as of October 2019.<sup>75</sup> And even Virginia Tech professor Marc Edwards has sued his critics—including Melissa Mays, the Flint mother we mentioned earlier—claiming that they defamed his reputation by disputing his definition of clean water. Now those who once fought together to address lead leeching are at odds over who gets to determine the safety threshold.<sup>76</sup>

As the damages of broken ties continue to unfold, perhaps a simple reminder is in order. "Water is the lifeblood of mother earth," said Autumn Peltier. "We are all connected."<sup>77</sup>

One in all and all in one.

## Pesticides and the Health of All

A one health, one justice understanding has a positive and negative symmetry. It is positive in the sense of rebuilding and recognizing ties to achieve justice founded upon mutual aid. It is negative, at least initially, with the startling recognition that an individualist understanding of life and justice is anything but. No one is free from environmental problems even as some are more acutely affected than others.

Perhaps nothing captures the ties between pollution and its multidimensional impacts better than pesticides. Environmental sociologist Jill Harrison writes that "without a doubt, pesticide illness constitutes one of the most widespread environmental problems today."<sup>78</sup> Worldwide, farmers apply billions of tons of pesticides to the land every year, including both chemical pesticides like atrazine and biological control agents like *Bacillus thuringiensis*.<sup>79</sup> In all, some 881 pesticides were in world use as of 2009, the most recent comprehensive global accounting, which was conducted by the WHO.<sup>80</sup> Of that 881, the WHO classified twenty-eight as "extremely hazardous," fifty-eight as "highly hazardous," 227 as "moderately hazardous," and 115 as "slightly hazardous." Eliminating the 274 pesticides that WHO did not include in its classification of hazard, that gives a figure of 71 percent of pesticides as being some degree of hazardous (see Figure 2.5).<sup>81</sup> In short, most pesticides are toxic, and some are highly toxic. That's why we use them, after all: to kill things. But toxicity has big implications for all bodies, human and otherwise.

**Figure 2.5 World Health Organization Rating of Pesticide Hazards**

WHO rating	Number	Percentage of all classified
extremely hazardous	28	4.6
highly hazardous	58	9.6
moderately hazardous	227	37.4
slightly hazardous	115	18.9
unlikely to be hazardous	179	29.5
not classified	274	NA

*Source:* World Health Organization (2010).

Take diseases like cancer. A number of pesticides are endocrine disrupters—that is, they mimic and interfere with hormonal activity. Endocrine disruption, in turn, can cause cancer. Glyphosate, the active ingredient in the popular herbicide Roundup, is a prominent example. The International Agency for Research on Cancer has determined that it is a probable carcinogen.<sup>82</sup> Yet glyphosate can be found around the world on farm fields, lawns, golf courses, and playgrounds, with more than 220 million pounds applied in the United States alone in 2015.<sup>83</sup> Although the science is still subject to ongoing debate, more than 40,000 people are arguing in court that glyphosate causes cancer—and that Monsanto has tried to cover it up.<sup>84</sup> These plaintiffs are part of the largest mass tort suit in history, leveled against Bayer, which recently acquired the agrichemical giant Monsanto and became the owner of Roundup.

The debate over glyphosate highlights how dangerous pesticides are for the farmers and agricultural workers exposed to them on a day-to-day basis. According to a 2019 meta-analysis of eight recent studies of occupational exposure, the typical worker had 0.26 to 73.5 micrograms per liter ( $\mu\text{g/L}$ ) of glyphosate in their system compared to 0.16 to 7.6  $\mu\text{g/L}$  for other adults.<sup>85</sup> Workers inhale it during application to crops, increasing their risk of diseases like non-Hodgkin's lymphoma.<sup>86</sup> They track contaminated dust into their homes on gloves and boots, increasing the likelihood of birth defects and chronic illness among their partners and children. But the risks of exposure go far beyond the farm. In a 2011 study of homes in New York City, pesticides were detected in 64 percent of samples of umbilical cord plasma from newborn babies and in 100 percent of indoor air samples. Parental exposure to pesticides was also associated with neurodevelopment problems for three-year-old kids.<sup>87</sup>

Glyphosate exemplifies just how omnipresent pesticides have become. Humans consume it through foods ranging from corn to almonds, which can contain residues for more than a year after they have been washed, prepared, or preserved.<sup>88</sup> Wind carries it into houses miles away from agricultural land.<sup>89</sup> A 2018 study of pet food found glyphosate residue in every bag

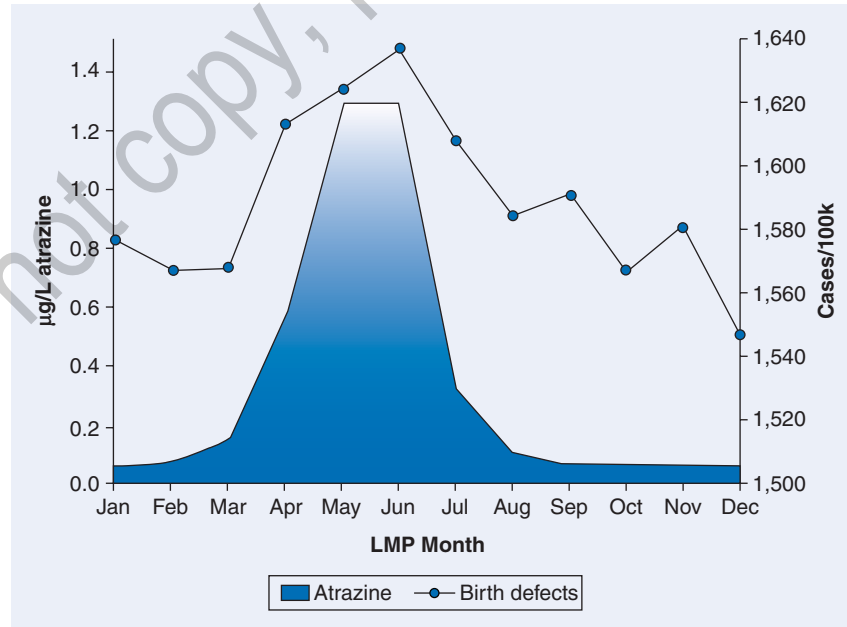
of dog and cat chow that was tested.<sup>90</sup> No one these days can completely escape the risks.

The complex ties of ecology mean that pesticides can have profound impacts on every stage of human reproduction. For example, a 2018 study found that exposure to glyphosate significantly decreased the sperm motility among otherwise healthy men.<sup>91</sup>

Pesticides are especially dangerous for fetuses, often associated with miscarriages and preterm delivery.<sup>92</sup> A national study of season and birth defects found the risk is highest for babies conceived in springtime, the season of the highest pesticide application. There was a particularly striking association with surface water contamination by atrazine, a widely used herbicide in the United States, long since banned in the European Union<sup>93</sup> (see Figure 2.6).

Importantly, children and people who are pregnant or nursing have particular sensitivities. They often eat more in relation to their body weight, increasing exposure. They may also eat more of foods that are typically higher in pesticide residues, such as the apples that go into conventional apple juice, a staple of young children's diets in many countries.<sup>94</sup> And when the body's cells are reproducing and growing rapidly, chances are higher that chemical pollutants will disrupt the body's development. Moreover, pesticides are especially likely to show up in breast milk. "If breast milk were to be sold in the supermarket," note health scientists, "this would often go

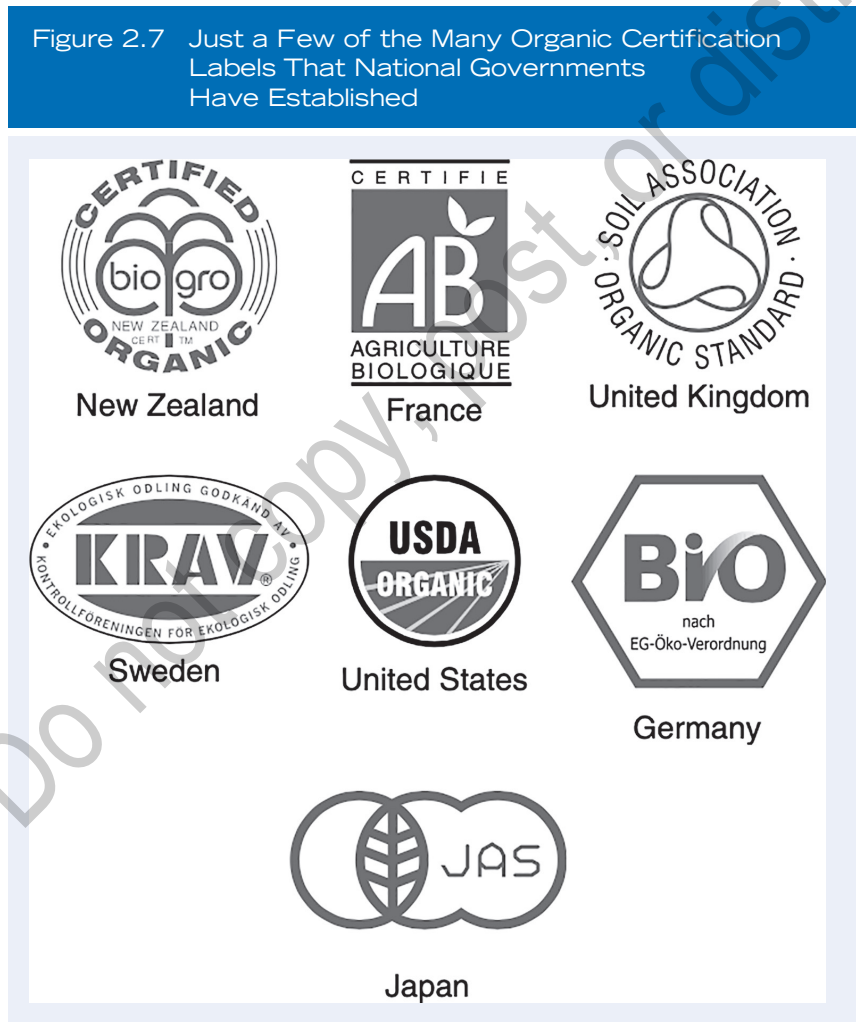
Figure 2.6 The Association Between Birth Defects, Mother's Last Menstrual Period (LMP), and Levels of the Herbicide Atrazine in U.S. Surface Water, 1996–2002



Source: Winchester, Huskins, and Ying (2009). Reprinted with permission.

against current rules of food quality.<sup>95</sup> Yet formula is hardly a safe alternative: A 2018 study found glyphosate was also present in soy-based infant formula.<sup>96</sup> What are concerned parents to do?

Although pervasive, the consequences of this exposure are not equal, as environmental sociologists, epidemiologists, and toxicologists have documented. Those with the closest ties to extractive and industrial industries often are the first to have rendered upon them the repercussions of a decoupled ecology. A 2002 study found that workers at Syngenta Corporation's atrazine plant in St. Gabriel, Louisiana, were coming down with prostate cancer at 3.5 times the expected rate for Louisiana.<sup>97</sup> In several recent cases, juries have awarded damages as high as \$2 billion in suits contending that glyphosate damages users.<sup>98</sup> Several countries have now banned glyphosate and many have set in motion plans to ban it soon—including Germany, which will prohibit its use beginning in 2023.<sup>99</sup>



Although more pronounced for some, shared exposure eventually gets the better of us all, at least to some degree, as toxins translate across species, time, and space. As Autumn Peltier reminds us, humans are born of water, as are countless other species, and thus we are all interconnected, for what sometimes can be the worst. Indeed, all of us are downwind or down the creek from pesticides lingering from use in urban or rural spaces or on the very food we consume.

Few people have the time or resources to fully consider these matters, but more and more are attempting to reduce pesticide exposure by eating organic food. In recent years, organics have become one of the fastest-growing sectors in food retailing. Growth in sales has been running between 5 and 12 percent in the United States for the past decade, reaching almost \$48 billion (5.7 percent of market share) in 2018.<sup>100</sup> Organics are also increasingly mainstream, with three out of four conventional supermarkets now offering certified products (see Figure 2.7 on p. 71).<sup>101</sup> Most of the major food corporations are busily buying up the smaller organic companies in an effort to cash in on this booming market and citizens' increasing concerns with the health effects of pesticides.

Yet individual consumer choices can only go so far. Organic food can sometimes cost a lot more. Even if you want to buy organic food to avoid pesticides, you may not be able to afford it, have the land to grow it, or have it sold anywhere nearby. "Yuppie chow" is what critics sometimes call organic food—and not unreasonably so in many circumstances. During winter months, Loka and Laura's families each have shares in a Community Supported Agriculture (CSA) farm, which means that they get as much bounty as the season has to offer, and the farmers get paid regardless. It's a wonderful idea for trying to bring money back to hardworking farmers who need it. But CSAs are still tied up in broader market pressures. Even in the most bountiful of times, there are not enough vegetables in Loka's \$30 weekly share to feed her family of four, meaning they still usually go to the store (there's not a winter market for local food where Loka lives, and she does not keep a garden that time of the year). Most of the vegetables in the share are not ones delivered in bulk or ones that some eaters might be familiar with. Rather than pounds of white potatoes and carrots, there are ounces of sprouts and kohlrabi and daikon.

True, these are specialty crops raised on a local farm. But the vegetables should not have to cost so much. Small farmers need policy support to help this happen, though; instead large industrial farms are much more subsidized at present. In the meantime, although healthful and delicious, the prices of these crops can be prohibitively high. Laura's CSA is subsidized by health insurance, but those programs don't exist for those like Loka in Alabama, one of the poorer states where people arguably need them the most.<sup>102</sup> In other words, organic food can become a vanity food.<sup>103</sup>

This raises issues of environmental justice. Although the environmental effects of pesticides have consequences for everyone, some people are better able than others to avoid these effects. It would be hard to escape all effects of pesticides. Even the wealthy and white sometimes find themselves in situations where it is difficult to eat as one might like. Even the wealthy and white have neighbors who douse their lawns with the latest chemical wonders—indeed, they may even more commonly have such neighbors,

given the conventions of landscaping in the suburbs. But those who are both wealthy and white also have considerable advantage in avoiding pesticides. For one thing, they rarely earn their living as farmworkers and lawn care workers, the people with the most direct contact with pesticides. And they can move. They have the money and resources to do so. That we all should be put in such a quandary, where to have safe food we have to spend more money, asks too much. A transformative future asks for something altogether different: health for us all in us all.

## One Justice

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But getting to one justice and one health faces some major roadblocks, especially the individualism that makes what is bad for one seem not so bad for another, and that encourages us to think about risk as a sacrifice that some must make for the good of others. In an imperfect world we have to make trade-offs, right? Someone has to take one for the team, right? But if you start off thinking this way, you are unlikely to try to do better—to work for one justice that enfolds everyone.

## Utilitarianism

Unfortunately, the dominant way we think about justice today—*utilitarianism*—embodies just such an individualist understanding of justice as trade-offs. In 1776, Jeremy Bentham provided what has been seen as the classic definition of *utilitarianism*: “It is the greatest happiness of the greatest number that is the measure of right and wrong.”<sup>104</sup> Another standard phrase to describe the goals of utilitarianism is that we should promote “the greatest good for the greatest number.”<sup>105</sup> It’s called “utilitarianism” because the good is defined as “utility,” or the degree to which an action promotes happiness. Central to utilitarianism is the principle that everyone’s happiness has equal moral standing, no matter the person’s social position. Also, most utilitarianism is strongly focused on results rather than the way we get there, a philosophical position known as *consequentialism*.

Utilitarianism can be found in much contemporary thought. Many democratic principles, such as the will of the majority, resonate strongly with utilitarianism. We can also see utilitarian ideals enshrined in the focus on growth in gross domestic product (GDP) as a mark of social improvement, what we might call *economic utilitarianism*. In this case, GDP is taken as a direct measure of the greatest source of utility in modern economies: money. If there is more of it around in the economy, people on the whole must be able to do more of what they want to do, which can only be for the greater good, the argument goes. Similarly, if the use of pesticides and other toxins helps feed the world and keep us in comfort, that must be for the greater good as well.

This common and deceptively simple notion of justice has a few stingers, though. Utilitarianism (at least as conventionally understood) accepts inequality in the distribution of the good. The greatest good for the greatest number—that’s the goal. But what if the greatest number’s good comes at the expense of a smaller number of people?

Consider the good of having pesticides to help raise crops. The chance of being caught in the blast wave of a pesticide factory explosion like at Bhopal is low, probably a good bit less than one in a million. We don't know the actual number, but it certainly is not a regular occurrence. And the chance of getting cancer or having a birth defect from atrazine is also low. It's never happened to us, at any rate. So maybe neither of these problems with pesticides is something we ourselves should worry about. Besides, we all need food if we are to solve the environmental challenges of hunger. The pesticides produced at Bhopal are helpful in our battle with pests and with the Earth itself, it might be argued, and indeed it often is argued. On the whole, pesticides are for the greater good of everyone, it is frequently said.

Of everyone? Really? Such might be the response to the view in the preceding paragraph. If a hazard has a one in a million chance, that means in a country the current size of the United States, 350 people will suffer from it, even die from it. You probably won't be affected, and the same is true for almost everyone else. But there are 350 people out there whom the hazard will indeed affect. So it would not be for the greater good of *everyone*. Likely most agree that it is not right for the majority to suffer for the benefit of a few. Yet is it right for a few to suffer for the benefit of the majority? Certainly, if you knew that you were going to be among that few, you would be unlikely to agree to such an arrangement. You might agree with nineteenth-century political theorist Alexis de Tocqueville that you are suffering from the *tyranny of the majority*, a member of a minority forced to surrender fundamental rights in service of the majority's interests.<sup>106</sup>

Or consider the people who live near a nuclear power plant. By statute in the United States, such plants must be located in rural areas, where fewer people live. As the U.S. Nuclear Regulatory Commission (NRC) states in its regulations, "Siting away from densely populated centers has been and will continue to be an important factor in evaluating applications for site approval."<sup>107</sup> That probably sounds reasonable to most of us. But what if you're one of the people who live "away from densely populated centers"?

Take Godley, Illinois, for example: population 601, quiet, peaceful, pastoral, surrounded by amber waves of grain. Yet less than half a mile to the east simmer the two nuclear reactors that comprise the Braidwood Nuclear Generating Station owned by Exelon Corporation. At sunrise, the reactors' shadows reach the town. Is it safe? Well, they haven't blown up yet and indeed are not likely to. What is more likely is what has already happened: Radiation leaks into the local groundwater. In 2005, residents discovered that the plant's wastewater pipe had been leaking for years—another case of a stuck valve, apparently—and that the wastewater contained radioactive tritium. Millions of gallons flowed out before the situation was detected. People then got suspicious about Exelon's nuclear facilities outside of Morris, Illinois (population 13,636), and outside of Byron, Illinois (population 3,686). It turned out those Exelon plants had also been leaking tritium into the local groundwater. The state of Illinois sued, and in 2010 Exelon agreed to a \$1 million civil settlement and also agreed to build a water treatment plant for the town of Godley. Nice—but a bit late, maybe?<sup>108</sup>

Moreover, there is nothing inherent in utilitarianism that requires the greatest number to be a majority of the population or even any more than a small minority of it—as long as the good applies to more than it might otherwise.



A handful of wealthy investors might be behind the siting of a potentially hazardous facility like a nuclear power plant. But look at how the NRC defines how big the “low population zone” for a nuclear site must be:

A low population zone of such size that an individual located at any point on its outer boundary who is exposed to the radioactive cloud resulting from the postulated fission product release (during the entire period of its passage) would not receive a total radiation dose to the whole body in excess of 25 rem or a total radiation dose in excess of 300 rem to the thyroid from iodine exposure.<sup>109</sup>

Cut through the jargon, and the implication is stark. Even in a rural area, a zone that size might include many thousands of people—probably none of whom are investors in the plant.

All other things being equal, utilitarianism does prefer to have the greatest good spread around. But the greatest good comes first. So if GDP for the country goes up, then utility has gone up, too, even if all the increase went to a few, or even just to one. Such ideas are actually enshrined in law. In the 1950s, the U.S. Supreme Court ruled that economic utilitarianism was synonymous with the public good, sanctioning the displacement of poor property owners with wealthier ones because the wealthy would produce more tax revenue. The production of money was equated with the public good, despite the negative implications for the displaced.<sup>110</sup>

But isn't a flourishing economy good for everyone in it? And isn't an abundant food supply good for everyone, too, even if many of us face greater cancer risks from the pesticides we use to get that abundance? Thank you very much, people of Bhopal and Godley, for taking one for the team. But where does it stop? A soldier dying for their country? How about murder, if the murder of one enhances the average happiness of most others? Or what about slavery of the few to enhance the happiness of the many? Without a balance with minority rights, utilitarian logic can become truly tyrannical.

One form of utilitarianism that tries to find some balance is the economic utilitarian notion of *Pareto optimality*, named for Vilfredo Pareto, an Italian economist from a century ago. Pareto counseled that we can allow greater advantage to some as long as it does not make others worse off. Sounds nice. But is it? Pareto optimality sounds pleasantly accommodating, yet advantage in a marketplace is always relative. If someone comes to have more to spend, even without taking money away from others, that person will be able to compete better in the market for what they want. The nonadvantaged will be relatively worse off even if nothing has been taken from them. And after a few relative nonadvantages accumulate, political disempowerment likely will, too. Thus, in practice, a Pareto optimal form of utilitarianism actually does make others worse off.<sup>111</sup>

Another trouble with utilitarianism is what philosopher Derek Parfit calls the “repugnant conclusion.”<sup>112</sup> If we accept that we want to maximize happiness, surely there would be more happiness to add up if there were simply more people around, as long as they were all happy. Parfit points out that, in fact, all these additional people would not have to be very happy at all. Imagine 1 billion people with ten units of happiness each, adding up to 10 billion units of happiness in total. Now imagine 10 billion and 1 people

with one unit of happiness each, adding up to 10 billion and 1 units of happiness in total. By this logic, having lots of barely happy people is better than having fewer quite happy people—meaning that we should encourage the human population to continually rise as long as people are all at least barely happy. Few environmentally or humanitarian-minded people would welcome such a prospect.

As citizens of a democracy, it can feel natural for a small number of people to sacrifice so the majority has it better. After all, democracy works that way, doesn't it? The majority wins the election, and the minority is forced to deal with being the underdog—at least until the next election (or so one can hope). But utilitarianism easily leads to the perverse result of benefiting only a minority while professing to do the opposite.

And even if there is benefit for the majority, shouldn't we be concerned about the minority, who are disadvantaged? Doesn't democracy also exist to defend minority rights and to uphold everyone's liberty?

### John Rawls and Justice as Fairness

Philosopher John Rawls said that we should indeed be concerned about the minority and for a selfish reason: We might ourselves wind up among the disadvantaged.<sup>113</sup> In his much discussed 1971 book, *A Theory of Justice*, Rawls asked that we stop for a moment and try to figure out what our principles of justice would be if none of us had any idea of where we would likely wind up in life. Put on an imaginary “veil of ignorance,” as Rawls termed it, about your life chances, and sit down with everyone else, similarly garbed. From this “original position,” asked Rawls, what principles of justice would people come up with?

Rawls's answer is that we would all commit to two basic principles, and we'll quote him verbatim on this:

1. Each person is to have an equal right to the most extensive basic liberty compatible with a similar liberty for others.
2. Social and economic inequalities are to be arranged so that they are both (a) reasonably expected to be to everyone's advantage and (b) attached to positions and offices open to all.<sup>114</sup>

In other words, Rawls says that if we didn't know where we would personally get to in life, we would want the greatest good for *everyone*, not just for the greatest number. We would also recognize that our own good must be realized within the context of others similarly, and justly, pursuing their own good. Liberty has constraints, most notably the liberty of other people. And we would recognize that we would not want others to seek advantage over us, and they would not want us to seek advantage over them.

We would also recognize that justice does not depend upon everyone being exactly equal. There are times when some forms of inequality are advantageous to everyone, if properly handled. Children gain some advantage from the authority their parents—who are more experienced in the dangers of the world—have over them. Students similarly, we must hope, gain some advantage from the greater experience of their teachers in the topic at hand.

Citizens gain some advantage through the coordination of social organization afforded by having police officers, mayors of cities, licensed medical experts such as nurses and doctors, and the like, all of whom we grant powers to that we may not have as individuals. But these offices must be advantageous to everyone, Rawls argued, not just to a majority, and they must be open to everyone as well, in part to ensure that they are indeed advantageous to everyone.

Rawls distilled his entire 607-page book into the following sentence:

All social values—liberty and opportunity, income and wealth, and bases of self-respect—are to be distributed equally unless an unequal distribution of any, or all, of these values is to everyone's advantage.<sup>115</sup>

He got it down even more tightly when he offered a definition of the opposite of justice: "Injustice, then, is simply inequalities that are not to the benefit of all."<sup>116</sup>

Rawls called his approach "justice as fairness," and it is a form of *egalitarianism*.<sup>117</sup> Utilitarianism may often feel egalitarian in its avowal of what promotes the greatest good for the greatest number. But utilitarianism can lead to outcomes that are not to everyone's advantage, as the previous section describes, even if the total happiness of the community concerned has gone up. Utilitarianism might well accept a technology that increases the risk of cancer by one in 1 million if more happiness were created than lost in the process. But justice as fairness would not accept such a technology. Maximizing happiness isn't its point. Maximizing fairness is.

The publication of Rawls's book touched off a huge discussion in political philosophy that continues today, even after Rawls's death in 2003. Many philosophers had long been troubled by some of the implications of utilitarianism but hadn't quite put their finger on a more compelling way to think about what is just. Many (but by no means all) now think Rawls's theory provides that. However, there remain a few substantial issues.

One concerned reader is economist Amartya Sen, who, although applauding much of what Rawls offered, has tried to build in a more pluralistic understanding of fairness.<sup>118</sup> Yes, says Sen, Rawls recognized that fairness didn't necessarily mean that everyone had to be equal in every regard as long as that inequality was to everyone's advantage. But Rawls seemed to have in mind mostly unequal positions in social hierarchy that are helpful for social organization. What if not everyone wants the same "social values" that Rawls said should otherwise be distributed equally or does not want them in the same degree and amounts?

Sen wants to make the pluralism of people's needs and wants more explicit. Sen wants a political system in which those with minority views and cultures can still maintain their ideas and practices with others. So he suggests that we think of people as having *functionings*, beings and doings they have reason to value, in the language of Sen, and *capabilities*, freedoms for attaining these beings and doings. Justice for Sen is maximizing people's capabilities to achieve their functionings. Lack of justice is when we do not do what we can to give people these capabilities. So, too, is poverty. Rather than seeing poverty as a lack of money, as conventional economics does, Sen says poverty is *capability deprivation*, and that our capabilities depend on a

lot more than money. Ill health would also be a form of capability deprivation, a kind of poverty of the body that prevents one from attaining valued beings and doings. So too would be environmental relations that did not support one's well-being and ability to secure a livelihood.

Sen's work has been widely embraced, most especially by development agencies and scholars. The well-known Human Development Index (HDI) of the United Nations Development Programme (UNDP) is a direct application of Sen's ideas about poverty being more than a matter of money and a direct challenge to the standard gross national income (GNI) or GDP per capita approach. GNI per capita—a form of economic utilitarianism, as we discussed earlier—equates money with what we value, gives us no sense of inequality levels within a country, and doesn't consider the variability in what people want. The HDI combines GNI per capita with measures of two other widely valued beings and doings: health (using longevity rates) and knowledge access (using literacy and school enrollment rates). It gives us a window (albeit an imperfect one) into the problem of within-country inequality by looking at a couple of measures of how people are doing, aside from their average income. And the HDI gets a degree of pluralism into the mix by suggesting there is more than one route to increasing human well-being other than money alone. Although a country's world rank in GNI per capita is typically similar to its world rank in HDI, often there are significant disparities. For example, as of 2018, the countries of Djibouti and Tajikistan have similar levels of GNI per capita: \$3,601 for Djibouti versus \$3,482 for Tajikistan. But Tajikistan has an HDI figure that is 33 percent higher: 0.656 versus Djibouti's 0.495.<sup>119</sup>

Rawls came to have much sympathy for these and other efforts to combine fairness with difference, and much of his later writing concerned this subject.<sup>120</sup> The details of his responses need not concern us here. But one thing that Rawls remained firm about is that unless you have a pretty good idea that you're going to wind up in a privileged position, you wouldn't choose to live in a society organized around utilitarianism—especially economic utilitarianism. Rather, you'd want to live in a society organized around conceptions of justice that enhance everybody's needs and wants.

### The Original Position of Mutual Aid

Rawls's vision would be great, but we can do even better. We must ask, how does justice as fairness welcome a one-in-all and all-in-one approach rather than a just one approach? And how can we use this framework to include nonhumans alongside humans?

At the heart of Rawls's theory lies a conceptualization of people as "rational" actors who are fundamentally economically self-interested. This is quite an assumption. By overemphasizing actors' self-interest, his approach underemphasizes the many reasons why individuals make ties with others. Rawls assumes we are selfish, for without this assumption, his argument of the original position would not hold, which is what Sen starts to get at through his focus on capabilities. Someone might actually want to let others have more of a particular pie or may not even want a piece of it in the first place.

All this remains patently of the human and patently of the individual. The widespread appeal of Rawls's original position matches the way we predominately think about risk and burden in discussions of the environment. We think about who gets sick, individually. We think about who makes money, individually. Because we think about consequences as well as interest individually, the state takes on a position as regulator of self-interested actors. The state then keeps competitive, self-interested individuals in line to make sure that no one is overly abused, or in Rawls's terms, to make sure any inequality is to the benefit of all. Rawls thus asks for procedural mediation by the government.<sup>121</sup> Such a framework does not leave much space for mutual ties in its beginning assumptions or end results.

A one-justice framework calls for a bit of a different starting place. It calls for starting with an *original position of mutual aid*, where we assume that social ecological ties inform how we regard the world and our place in it. In the original position of mutual aid, the prosperity and even survival of one is tied into the prosperity of all. It goes beyond fair treatment of individuals to recognize that we truly only do well when we all do well. Ties are considered from the start, principled on the foundation of empathy and impact, as what circles through one circles back through all. The state then takes on a supportive role to enable flourishing rather than monitoring self-interest. Rather than enforcing a utilitarian or economic self-interested version of justice, in which each is untied from each other, the original position of mutual aid founds our well-being on the well-being of everyone in our social ecology. One may be animal or nonanimal. One may be concerned mostly about the happiness of a child, the success of a career, or playfully enjoying life. What defines this original position of mutual aid, though, is the matter of ties. Rather than a regulator of bad intentions, government mediates our commitments to the biggest community of all and enables our understanding of our consequences for it. A social ecological index, perhaps, comes to replace the HDI as the justice of one folds into the justice of all.

## Living Downstream: The Precautionary Principle

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OK, one justice sounds good, but how do we actually incorporate mutual ties in a world of states that often are focused on regulating bad intentions rather than facilitating good ones? Certainly, ecologies everywhere remain intertwined and recognized to some degree by those who live among them. Translating that into institutional action is another matter altogether, even in face of the gravest needs.

"You have stolen my dreams and my childhood with your empty words," Greta Thunberg told the UN Climate Action Summit in September 2019. "And yet I'm one of the lucky ones. . . . You are failing us. But the young people are starting to understand your betrayal. The eyes of all future generations are upon you. And if you choose to fail us, I say: We will never forgive you."<sup>122</sup>

How can institutional failure to protect the future be remedied? The *precautionary principle* provides a way to shift how we think about our everyday interactions with the environment and how our government operates

to protect today and prevent tragic consequences tomorrow. As a principle, precaution simply means thinking, behaving, and regulating in ways that prevent problems down the road—for example, forecasting climate change and acting on it before it becomes a climate crisis.

The prevailing formula for regulatory agencies, though, is something quite different. Typically, every agency is required to regulate through *cost-benefit analysis*, where the consequences of a policy or project are calculated in monetary terms for all members of society. This is raw utilitarianism in practice. At its most basic level lies a simple formula in which the net social benefits are considered the social benefits minus the social costs.<sup>123</sup> Minorities, like those we have discussed in this chapter, are regularly the cheapest to burden. Further, anyone can become a minority depending on the issue at hand, as *majority cannibalism* often leaves those who were majorities in one regard sacrificial in another context.<sup>124</sup>

Another way of thinking about the precautionary principle is through the fluid metaphor offered by ecologist and author Sandra Steingraber: “Living downstream,” she calls it in her book by that title.<sup>125</sup> Because of the body’s perpetual dialogue with an environment on the move, we are all always living downstream, in both space and time, of what goes on around us. We may wish sometimes that we were separate. But we’re not. Nor are the life-forms along the pathways of contaminant transfer. Moreover, it turns out that in matters of who is dumped on downstream, we are neither separate nor equal. The trouble is that we often don’t look to see who is downstream in space and time. They are, in effect, invisible to us. Indeed, it may well be that we are being invisible to ourselves, for it may well be us who are living downstream.

This recognition of how we are each in the other suggests a reformulation of the Golden Rule: In the words of Wendell Berry, “Do unto those downstream as you would have those upstream do unto you.”<sup>126</sup> Or put another way that couples the ecological into the social: Do outwardly to all as you would have done inwardly to yourself.

## Mercury and the People of Grassy Narrows

In 1970, a small band of Ojibwa Indians living in the Grassy Narrows reservation in remote northwest Ontario learned that they were literally living downstream. In that year, government authorities realized that some 20,000 pounds of mercury had been released over a ten-year period from a paper mill into the Wabigoon River, 80 miles upstream from Grassy Narrows. There, in the river, ecological processes converted the mercury to methyl mercury, one of the most toxic substances to be found in any chemistry book. Methyl mercury steals a person’s vision, hearing, agility, ability to feel, memory, and emotional control—and eventually a person’s life. The affected walk with a kind of stagger, a glazed and glassy expression on their faces.

Methyl mercury is a sly and crafty toxin. It has no taste and no smell. It can’t be seen in the water or in the fish. It can’t be felt either. As an Ojibwa elder described to a visiting journalist, “But you know it’s there. You know it can hurt you, make your limbs go numb, make your spirit sick. But I don’t understand it. I don’t understand how the land can turn against us.”<sup>127</sup>

This sense of everything, even the land, turning against you can be one of the worst effects of methyl mercury and other toxins that are largely invisible to our senses, as sociologist Kai Erikson has observed.<sup>128</sup> As Erikson puts it, methyl mercury poisoned the minds of the Ojibwa of Grassy Narrows with “a pervasive fear that the world of nature and the world of human beings cannot be trusted in the old way.”<sup>129</sup>

Not without reason—the connection between violations of environmental justice and economic justice is often an interactive one, as the people of Grassy Narrows discovered. Once it became known that the river on which they had long relied for food and income was polluted with methyl mercury, the Canadian government banned fishing there. It had to be banned, of course, but that threw an already poor people out of much of the little work they had.

It also threw them, in a way, out of their culture. For the work we do is more than a source of income and sustenance. It is a source of pride and purpose, of self and the embedding of self in the lives of others. “We are now a people with a broken culture” is how Simon Fobister, chief of the Grassy Narrows band, put it.<sup>130</sup>

If your culture is broken, you may find yourself looking for purpose in drink. At least so it was in Grassy Narrows, where after the closing of the river to fishing, alcohol abuse skyrocketed. Mortality rates skyrocketed, too, as alcohol abuse led to violence, accidents, and health troubles. As Erikson notes, out of roughly 400 members of the Grassy Narrows band, thirty-five persons—about 9 percent—died between 1974 and 1978. This is a huge mortality rate. Some 80 percent of these deaths were either directly or indirectly related to alcohol: suicides, murders, drownings, alcohol poisoning, and heart failure from excessive drink.<sup>131</sup> It is methyl mercury’s poisoning of their minds, breaking their culture, that led to alcoholism problems among the Ojibwa of Grassy Narrows.

Plus, there is a further cruel feature of methyl mercury’s poisoning of the flesh: the way its effects mimic those of alcohol abuse. As Erikson observes, considering the physical symptoms of methyl mercury poisoning,

Now if you were asked where one might find a group of persons with slurred speech and difficulty in focusing, with a lumbering gait and uncertain coordination, with a glazed and numbed look about them interrupted at times by violent outbursts of temper, what might you suggest?<sup>132</sup>

Thus, when alcohol abuse is also present, it can be a hard matter to ascertain with any surety that methyl mercury’s effects are being directly manifested. It’s a long, leisurely poison, an example of what Rob Nixon has called *slow violence*.<sup>133</sup>

But either directly or indirectly, fast or slow, the result is the same. As another Grassy Narrows elder put it, “Now we have nothing. Not the old. Not the new.”<sup>134</sup>

Imagine if regulatory agencies set aside cost-benefit analysis, which favors industry discharge first and human impact last. Imagine if they regulated based on the precautionary principle, where upstream ties into downstream.

Those forced to bear the burden of proof would not be those downstream but rather those upstream who are responsible for preventing pollution and environmental harm in the first place.

The precautionary principle also calls for what Phil Brown calls *cumulative risk assessment*, the study of both short- and long-term risks to understand how exposure compiles over time relative to different body types and different environmental locations.<sup>135</sup> For example, pregnant people and children are more vulnerable to some types of exposure, as we discussed earlier in this chapter. Precautionary regulations help ensure we take relative vulnerabilities like this into account.

As well, if regulation used the precautionary principle, facilities like nuclear power plants would have to demonstrate to communities that they operate cleanly rather than assuming it until shown otherwise—like with the tritium leakage from Exelon’s nuclear plants. Such a regulatory standard would not necessarily feel burdensome on a business, though. It may feel like the right thing to do. It’s the business’s own community that might be affected, after all. But, yes, it might well feel burdensome for companies counting on sliding their operations into the poorest, most vulnerable places, with little warning of the dangers they bring.

The precautionary principle is not only regulatory, however. It can be quite personal, an ethic we absorb into how we live and one that connects back to all the materiality we’ll continue to talk about in the chapters to come. Practicing precaution is hard. When you try to bring it into your everyday life, you might find you don’t have the information necessary to make a fully informed, precautionary decision. But doubt is no stranger to the precautionary principle. It’s the whole point.

## Making Ties

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A one-justice, one-health approach isn’t just about regulation. It also concerns the practical art of living with others in our social ecology. The original position of mutual aid calls for making ties across time, social space, and species, before unfortunate ends materialize, as they did for the people of Grassy Narrows, Bhopal, Godley, and so many other places.

It also calls for enabling *community power*—the capacity for social ecological ties to flourish in the world and thus within the biggest community of all. Power is not necessarily a bad thing. It would be neither an enjoyable nor a just world if life-forms were not able to exercise some control over situations. This is precisely why Sen emphasizes the importance of people’s capabilities to achieve the functionings they value. For humans, this control has to be realized within the context of others similarly seeking to achieve the functionings they value for themselves. Justice then requires some means of balancing these capabilities in ways that do not disadvantage others. However, that balance does not now exist in many places, if any. Some have much power, whereas others have little.

For community power to flourish, a rethinking is in order, where we moderns do not just understand our bodies and ourselves atomistically. One justice depends upon careful consideration of the conceptions that we bring



to bear on the consequences we have for one another. This chapter has concerned a basic material fundamental—health—and has equally concerned some basic fundamentals in the realm of our ideas, from how we consider justice to how we think about our bodies and their interactive relationship with the world. “For meaning,” David Abram has written, “remains rooted in the sensory life of the body—it cannot be completely cut off from the soil of direct, perceptual experience without withering and dying.”<sup>136</sup>

Fortunately, we are increasingly remembering what we should never have forgotten: that our bodies abide in a social ecological abode. This recovery of the body in environmental thought has led to many new initiatives, such the rise of the “slow food” movement and its promotion of “good, clean, and fair food for all,” as the group Slow Food International puts it in its mission statement.<sup>137</sup> The efforts of Rawls, Sen, and others to shift us away from utilitarian thinking are also already having some material effects. The U.S. government’s Food Quality Protection Act of 1996, with the special attention it gives to the developmental differences of children’s bodies, is an example. And perhaps a one-justice, one-health view that starts from the original position of mutual aid—rather than the original position of individualism—will encourage us to better prepare for the next pandemic. For an *all-in-one, one-in-all* ideal links health into justice across time, social space, and species.

There really are ways to arrange our lives to the advantage of all if we appropriately apply our minds to the task of forging mutual ties. What seems impossible then becomes normal: the normal justice of normal environmentalism.