Conclusion

If We Would Know Life

Come, my friends,
'Tis not too late to seek a newer world.
—Alfred, Lord Tennyson

On 17 February 1965, at the fourth Mellon Lecture at the University of Pittsburgh's School of Medicine, Commoner gave a paper titled "Is Biology a Molecular Science?" He criticized molecular biology and the new cult of DNA, which promised to unlock the secret of life, and concluded his remarks with the assertion "If we would know life, we must cherish it—in our laboratories and in the world."[1] It was a simple statement, but one that would resonate through most all of his activism and take on especially poignant significance by the end of the twentieth century. Commoner's environmental apparatus—dissent, information, and public risk analysis—had been designed precisely to avoid the hubris inherent in the notion that human science and technology were impervious to the laws of nature. At the beginning of the twenty-first century, however, that remained a lesson learned only in retrospect.

Early in 2002, Commoner would reiterate his conviction that life must be cherished in an article in *Harper's* that put him back in the center of a public and scientific maelstrom. As the Human Genome Project conceded that it would not uncover enough genes to account for the complexity of our inherited traits, as activists all over the world—and especially in Europe—had taken to the streets to oppose the continued development of biotechnology and genetically modified food products, Commoner closed another circle by returning to the discipline in which he had started his career, cautioning against renewed technological optimism, pointing to the limits of DNA analysis, and reviving his faith in the science information

movement. "Biology once was regarded as a languid, largely descriptive discipline, a passive science that was content, for much of its history, merely to observe the natural world rather than change it," he wrote. "No longer."[2] In many respects, biotechnology is a fitting conclusion to this study, because it encapsulates the spectrum of Commoner's larger social and scientific concerns and the problems that propelled him into the vanguard of American environmentalism.

For forty years, Commoner's criticisms of the petrochemical industry focused on the manner in which its products barged unwelcome into the chemistry of living things and polluted people, animals, and ecosystems. While most of the chemicals manufactured or released as waste by the petrochemical industry resembled the structure of chemical components found in nature, they were sufficiently different to be hazardous to life. To Commoner, the connection to twenty-first century genetic engineering was clear: we were in the process of committing the same tragic error, but this time with the secret of life. According to Stephen Fox, "Commoner resisted genetic theory, because it applied models from physics and chemistry to living cells, thereby wiping out the vital distinction between animate and inanimate matter. Without that distinction in place, modern technology was free to manipulate inanimate nature with a blithe disregard for any implications for living creatures."[3] But Commoner's attack was not based on such a strictly conservationist or philosophical concern over the social repercussions of what constituted inanimate matter. To Commoner, the politics and economics of scientific research had dubbed genetic theory as the new field that warranted unconditional support, but by the turn of the century genetic theory was still prone to disaster because it did not "take into account *all* the relevant data and [was] based on an arbitrary exclusion of certain essential facts."[4] In many respects, then, Commoner's critique was a reiteration of his long-held concern about technological progress creating or stumbling into unanticipated problems. Enthusiasm for the potential of technology, he argued, constituted the protean source of social and scientific mismanagement that "too often . . . has led us to exaggerate our power to control the potent agents which we have let loose in the environment."[5] The promise of genetic engineering represented another example of profit supplanting uncertainty in the determination of the risk.

With typical flair, Commoner noted in 1967: "It should now be clear that the power given to man by modern science is based on seriously in-

complete knowledge and carries with it the grave risk of acting in ignorance. The notion that we must unquestioningly use the power that science endows has now become an unreliable guide to modern life."[6] Out of the laboratory and into the farmer's field (and, indeed, the frying pan), genetic engineering immediately became an environmental issue. To critics, the new science brought dark and ominous implications to American food production and consumption. Commoner referred to biotechnology as "an endless invasion into life. . . . We don't know what's going to happen but something will happen and I think we need to be afraid."[7] As difficult as it was to escape the hazards of nuclear fallout, the relative ubiquity of molecular biology's fruits (and vegetables and animals, for that matter) could potentially pose an equally unavoidable threat. Its capacity to selectively transfer genes from one *species* to another was an incredible feat of technology that far surpassed any innovation of Mendelian selective breeding. The science of the genome has been adopted by the food industry to grow bigger, faster, cheaper crops. Flavr Savr tomatoes, for example, were designed to ripen more slowly, so they would last longer after being picked; corn and soybeans were made tolerant of pesticides; canola, papaya, cotton, and countless other crops were "improved" in one way or another. As we have already witnessed in the production of automobiles, plastics, and synthetic chemicals generally, bigger, faster, cheaper does not always mean better, healthier, and more environmentally sound. Nor does it imply careful analysis of unforeseen environmental costs.

Armed with the weapons necessary to break the genetic code, molecular biology appeared, in Commoner's words, "poised to assume godlike powers of creation, calling forth artificial forms of life rather than undiscovered elements and subatomic particles."[8] The molecular biologists' conceit eerily mirrored a similar aura of omnipotence that had surrounded the antagonists of Commoner's first environmental campaign. After World War II, as the scientific supremacy of nuclear physics evolved into a Cold War arms race, physicists were increasingly disparaged for introducing the potential for global annihilation and the unanticipated fallout hazards that accompanied nuclear weapons testing.[9] Physicists successfully smashed the nucleus of the atom, but they found that they were unable to predict the properties of the whole nucleus by studying its parts. This oversight had been the ecological failing of the petrochemical industry as well, as it produced chemicals that reacted poorly in the environment. The

results were alarming, and were indicative of what Pnina Abir-Am regarded as part of the "ongoing historical process of 'progressive colonization' by the so-called exact sciences."[10] Fallout poisoned Americans indiscriminately; DDT was more effective than it was supposed to be; and at the end of the twentieth century, after thirty years of heightened environmental awareness, American air and water systems experienced dangerously high levels of toxicity. Commoner argued that only through examining matter in its natural environment could relationships with other organisms be properly understood. The human condition was inextricably linked to biological systems. Everything was indeed connected to everything else.

Commoner's insistence on the importance of cherishing life struck at the very nerve center of environmental concern. It preached caution and warned against unmitigated technological enthusiasm, the products of which had galvanized Commoner, Rachel Carson, and a new environmental movement to protest the proliferation of chemical pollutants. To cherish life also meant to abandon the fallacy that humans could completely dominate or control nature. This line of thinking was the crux of conservationist thought and had developed a strong following since the Progressive era. Further, cherishing life also challenged the unquestioning application of science. The pursuit of knowledge was a worthy goal, but its utility seemed to have been perverted from improving human welfare to promoting industrial progress and equating welfare with levels of consumption. In this capacity, Commoner spoke as a scientist, criticizing the hubris of his own discipline. Most important, however, cherishing life offered a powerful directive on how societies and people should interact. How could we work to protect nature if we were unable to treat each other more humanely? In this vein, working for peace and against poverty, for civil and women's rights and against tyranny, intersected with more traditional environmental interests as part of the same mission. In essence, cherishing life meant striving toward a more egalitarian world.

In 1997, just as he readied himself to refocus his energy on genetic theory, Commoner turned eighty. In recognition of his birthday, a symposium was held in New York City to celebrate him as an international leader in the environmental movement. Invited speakers from around the world—friends, colleagues, and fellow activists of all stripes—spoke about Commoner's

influence and contribution. Peter Montague, the director of the Environmental Research Foundation, championed Commoner as "the father of grassroots environmentalism," charting the influence of his career on grassroots environmentalism in the United States. Montague pointed out that Commoner "developed many of the fundamental ideas that today propel the burgeoning movement of grassroots environmental activism." These included such tenets as the public being the guardians of moral wisdom and having a right to know the risks inherent in policy decisions; specialists possess no special moral authority and have an obligation to make alliances with citizens; pollution must be prevented, because it cannot be successfully managed; and the understanding of risk is political in nature, not scientific.[11]

Commoner's longtime fellow activist, Virginia Brodine, followed Montague and reflected on the significance of the Committees for Nuclear and Environmental Information. While Montague addressed Commoner's influence on grassroots activism, Brodine talked specifically about the power of the science information movement as a mode of public empowerment. That movement, Brodine contended, was buoyed by Commoner's clarity of purpose. "What carried . . . the whole organization along more than anything else was Barry Commoner's unwavering confidence in the importance of information and the ability of the public to understand and use it."[12] After Brodine, the labor leader Tony Mazzocchi recalled the environmental and occupational health work in which Commoner had engaged, demonstrating the relationship between labor and the environment. He was followed by Ralph Nader, who attacked "junk science," and the dangerous relationship between science and corporate money.

Cumulatively, the papers presented in celebration of Commoner's birthday painted a picture of Commoner's activism since World War II. His mode of dissent—the insistence on the importance of open discourse—reflected the period. As the Cold War imposed a cultural and political conformity that polarized American society and ghettoized disparate social concerns such as those for the environment and social justice, Commoner struggled to create a forum for public discourse and dissent. He framed his position in American values, particularly the centrality of democracy to the American condition and the scientist's responsibility to the public, and proceeded to draw connections between social and environmental problems that developed after World War II. The message was unashamedly

holistic. As Nader observed, Commoner refrained from limiting his criticism of environmental issues to particular risk or hazard levels. Rather, "He asks much more fundamental questions as to what is the utility of the petrochemical industry and why do we even have a fossil fuel-based industry projected into the next century? What is the nature of industrial organizations that has to be changed so that we develop different kinds of incentives for different kinds of environmentally benign technologies?"[13] The bigger questions provoked bigger challenges to American political and economic systems.

Commoner gave the final address that day: a paper titled "What Is Yet to Be Done," a none-too-subtle reference to Lenin's celebrated essay. Commoner's was a lighthearted speech, but one laced with a solemn sense of purpose that in more than fifty years of activism had not waned. "The environmental crisis expresses the relation between science and society in a special way," he told the gathering. "It illustrates the overriding importance of action."[14] The themes he presented were familiar and wide-ranging. "The environmental crisis arises from a fundamental fault," he claimed:

> Our systems of production—in industry, agriculture, energy, and transportation—essential as they are, make people sick and die. As the Surgeon General would say, these processes are hazardous to your health. But that is only the *immediate* problem. Down the line, these same production processes threaten a series of global human catastrophes: higher temperatures; the seas rising to flood many of the world's cities; more frequent severe weather; and dangerous exposure to ultraviolet radiation. The nonhuman sectors of the living ecosystem are also affected by the crisis: ancient forest reserves are disappearing; wetlands and estuaries are impaired; numerous species are threatened with extinction.[15]

But the environmental crisis was a human event, caused by what people do, and the ultimate measure of its impact was the threat to human health and well-being. If environmentalism was devoted to human welfare, Commoner argued, then the northern exploitation of the southern world needed to be addressed. "We, who are environmental advocates, must find a way—for the sake of the planet and the people who live on it—to join a historic mission to end poverty wherever it exists. That," he concluded, "is what is yet to be done."[16]

From the late nineteenth century to World War II, Americans witnessed "the transformation of science from a mostly amateur and individualized undertaking to a complex, professionalized, and largely government-

sponsored endeavor."[17] The organizational and financial advantages of such a transformation were obvious. The danger, however, was that expertise might trump public interest and culminate in the cloistering of scientific knowledge and, as a result, policy and decision-making. These fears came to fruition during the Cold War as concerns over national security condoned secrecy. By the beginning of the 1960s, outgoing President Dwight D. Eisenhower warned against the impending powers of the emerging military-industrial complex. In his study of the postwar science establishment, Stuart W. Leslie called it the military-industrial-academic complex in order to emphasize the complicity of independent research.[18] From its earliest stages, Commoner's career sought to reconnect professionalized science with the public interest. If it sounded like a crusade, that is because—in a sense—it was. As the 1960s ushered in a period of receptivity to environmental protection, Commoner couched his rhetoric in that burgeoning language.

In so doing, Commoner influenced the direction of the modern environmental movement and helped foster its sophisticated concern for public health and the human body as an environmental landscape needing protection. The marriage of natural resource conservation and public health was frequently divisive, but it also generated a new and innovative arsenal as well as novel directions for environmental activism—economics, class politics, and globalization, for example—and presented the prospect of further coalitions that transcended race, class, and national boundaries. That is the optimistic conclusion, anyway. And it is one that sees the contemporary debates over genetic engineering and global warming as the greatest environmental threats since nuclear weapons, but also as having the potential to unite the disparate factions of American environmentalism. Conservationists, environmental justice advocates, radical environmentalists, and human health advocates express grave concerns about genetic engineering and global warming. A common front might indeed restimulate American environmentalism. But that is the optimistic conclusion. Though he was ever the congenital optimist, Commoner acknowledged that the scale and the scope of environmental deterioration were becoming more—rather than less—worrisome.

Indeed, Commoner's historical significance and the tragedy of this narrative stem from the breadth of environmental issues he addressed that remain not just historical artifacts but ongoing contemporary problems.

And at a point when the direction of the contemporary environmental movement is at best unclear, perhaps Commoner's career warrants more careful attention. The apparatus he brought to his activism and the manner in which he sought to define the relationship between environmental issues and a more comprehensive movement for social justice might be worth another—more careful—look. During the latter half of the twentieth century, Commoner represented a durable, stalwart, and remarkably consistent position that American society needed to revise the manner in which it accepted or rejected risk. He saw this revision as being integral to any program that might offer social and environmental sustainability over the long term, but he also insisted it was a critical and missing element of a functional democracy. As a prominent and early dissenting voice in the discourse on postwar technological influence, Commoner helps shed light on the moral and political intricacies of American society *inside* the environmental crisis.

Notes

Introduction: The New Apparatus

1. Barry Commoner, *The Closing Circle: Nature, Man, and Technology* (New York: Knopf, 1971), 11.

2. Rachel Carson, *Silent Spring* (Boston: Houghton Mifflin, 1962).

3. This suggestion is put forward by Theodore M. Porter in *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life* (Princeton, NJ: Princeton University Press, 1995), 16. See also Edmund Russell, *War and Nature: Fighting Humans and Insects With Chemicals From World War I to Silent Spring* (New York: Cambridge University Press, 2001). Russell posits the theory that "war and nature coevolved: the control of nature expanded the scale of war, and war expanded the scale on which people controlled nature." See page 2.

4. Commoner, *The Closing Circle,* 129.

5. Barry Commoner, *Science and Survival* (New York: Viking Press, 1966), 3.

6. Samuel P. Hays, *Beauty, Health, and Permanence: Environmental Politics in the United States, 1955–1985* (Cambridge: Cambridge University Press, 1987), 4–5.

7. Lydia Saad and Riley Dunlap, "Americans Are Environmentally Friendly, but Issue Not Seen as Urgent Problem," *Gallup Poll Monthly* 415 (April 2000), 12–18.

8. Arthur Ekirch, Jr., *Man and Nature in America* (New York: Columbia University Press, 1963), 189.

9. While the average fuel rate (miles per gallon) for vehicles on American roads has increased substantially since 1973 (from 11.9 miles per gallon in 1973 to 16.9 miles per gallon in 2000), recently there has been a distressing move to larger vehicles. The ratio of passenger cars to total vehicles declined from 80 percent in 1977 to 64 percent in 1995. See George Martin, "Grounding Social Ecology: Landscape, Settlement, and Right of Way," *Capitalism Nature Socialism* 13 (March 2002), 3–30. Bigger vehicles invariably mean greater fuel consumption, so while passenger cars have continued to become more fuel-efficient, the average fuel rate for all vehicles has fluctuated only mildly since 1991. See the Department of Energy Web site statistics: http://www.eia.doe.gov/emeu/aer/txt/ptb0209.html. Further, while per vehicle fuel consumption is lower than before the oil crisis, it has