BOOK REVIEW PERSPECTIVES

Michael Egan, *Barry Commoner and the Science of Survival: The Remaking of American Environmentalism*

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Michael Egan has done an important service for mainstream environmental advocates who know little about the life’s work and uncommon mind of Barry Commoner, biologist, radical activist, unapologetic socialist, democratic idealist. Egan also has done an important service for scholars in the interdisciplinary field of science and technology studies (STS)—a key component of contemporary sustainability science—few of whom, it seems, have seriously examined Commoner’s political philosophy of environment and technology, his impact on twentieth century environmental activism, and his model of politically engaged scientific expertise.

Egan provides a fascinating and ultimately somewhat depressing account of what he calls Commoner’s “novel apparatus” of activist, democratic science. It holds that scientists have three obligations: to vigorously dissent when science is mobilized in ways that harm the Earth’s support systems and human well being; to disseminate scientific information in a form that can readily be understood by the public; and to facilitate and encourage active public engagement in deliberation on technological and environmental risk.

Early in the book, Egan gives a systematic account of Commoner’s remarkable deployment of this apparatus in tirelessly focusing public and scientific attention on the health threat posed by mid-twentieth century atmospheric testing of nuclear weapons. Commoner mobilized scientific dissent, fed the public crucial data that documented the risks posed by fallout, and mobilized even children to oppose the threat. The biography demonstrates that the biologist’s intensive efforts via a succession of high-profile scientific committees and panels—several of which he had a hand in creating—were crucial in documenting the weapons’ environmental implications and creating a groundswell of concern that prompted the 1963 Nuclear Test Ban Treaty.

In the wake of that victory, Commoner (along with Rachel Carson, whose *Silent Spring* was published in 1962) emerged as one of the most recognizable faces of the Age of Ecology. Egan, who conducted numerous interviews and combed Commoner’s papers in the Library of Congress, relentlessly documents the biologist’s path to the cover of *Time* magazine in 1970, the marginalization of his ideas during the first Earth Day, and his damaging battle with Paul Ehrlich over the significance of population growth as a factor in environmental degradation in the early 1970s. (Commoner argued it was not population growth per se, but “polluting technologies and the free market that produced them [that] caused the…crisis,” Egan writes.) The book continues with Commoner’s struggle to convince the American public to confront overconsumption and to move toward democratic socialism in the mid-1970s and his ineffective effort to forge a coalition of the poor, minorities, and workers during a bid for the presidency in 1980.

If Commoner’s success was muted in this second phase of his public career, *Barry Commoner and the Science of Survival* suggests it was even more muted in the third, post-1980 phase. And as Egan shows Commoner’s influence diminishing, or at least becoming less direct, the book’s historiographic strategy becomes somewhat oblique. It locates Commoner’s ideas in the context of the evolving environmental movement of the 1980s and beyond—often revealing these ideas to be prescient—but rarely shows them directly influencing the evolution of even the grassroots toxics and environmental justice movements. Here the book more nearly offers a conceptual history of the movement juxtaposed with Commoner’s scientific vision and political vision than a history of the biologist’s practical role. And, in some respects, Egan’s narrative seems oddly detached from one of the main features of the broad movement’s history during this era: its struggle to cope with the technocratic antienvironmental backlash that began under Reagan and has continued in numerous guises ever since (Vig & Kraft, 2010). (Tellingly, Reagan’s name appears only once in the book’s index and once in its 49 pages of endnotes.)
We see Commoner’s Center for the Biology of Natural Systems concentrating on solid waste incinerators and the exquisitely toxic class of substances known as dioxins, but his connections with and influence on the grassroots-toxics movement that led the public fight against incineration and dioxin never quite come into focus. (This includes his influence on one of the movement’s architects, Peter Montague, whose long labor in making environmental science accessible to lay people—as Commoner prescribes—is legendary. Egan cites Montague’s work extensively, but, surprisingly, not his dissertation on Commoner and Ralph Nader.) We see Commoner speaking about the endocrine-disrupting effects of substances like dioxin, but it never becomes clear just what role he had in the mobilization to document and publicize these effects and force the hand of government agencies inclined to study rather than regulate them (see Krimsky, 2000). We see Commoner focusing on industrial pollutants’ infiltration into the human body (a theme he had pursued since the days of atmospheric nuclear testing), but whatever role he might have had in the blossoming of movement concern about “body burden” in the 1990s and early 2000s (e.g., Houlihan et al. 2003) remains fuzzy. We see Commoner arguing extensively that the poor and racial minorities are disproportionately exposed to industrial contamination (a theme for him since the 1960s), and applauding the emergence of the environmental justice movement, but his relationship with that movement in the 1980s and 1990s is never sharply defined.

The oblique character of Egan’s account of this period is illustrated by his approach to Commoner’s support for a major tenet of the grassroots environmental movement in the United States: the precautionary principle. Egan convincingly shows Commoner to have had a strong precautionary impulse throughout his career. He quotes the biologist arguing in 1966, in reference to DDT and other synthetic substances, that “we have risked these hazards before we knew what harm they might do.” In a speech that year, Commoner said:

[The] record shows that we do not yet understand the environment well enough to make new intrusions on it, on the large scale that is now possible, with any reasonable expectation of accurately predicting the consequences. Pollution by detergents, pesticides, herbicides, radioisotopes, and smog...represents a blind intrusion into aspects of the complex biology of the environment which are still poorly understood. Apart from their known hazards these pollutants represent a huge gamble.

Egan shows Commoner making distinctly precautionary statements about thalidomide in the 1960s, genetic engineering in the 1980s, and incineration in the 1990s. Despite the prominence of the precautionary principle in American environmental debate since the 1980s, however, Egan points explicitly to it only once in the text and once in a note, both times demonstrating that Commoner’s sensibility resonates with the principle but without specifying whether he endorsed or campaigned for it.

Consider, too, that Egan’s account of Commoner’s views on risk deliberation, the third leg of his apparatus, is something of a muddle. Egan assures us that Commoner rejected technocratic assessment of risks: “Calculating risks...was not an equation that could be concocted by experts, but rather a question of social values and ethics that required far greater public participation.” But the picture of Commoner’s perspective frequently drifts toward the technocratic, as when Egan quotes Commoner’s 1966 book, Science and Survival, on the hazards of synthetic pesticides in the Mississippi River: “The only feasible way to judge the significance of this contamination is to estimate the risks, compare them with the benefits...and strike a balance...that will be acceptable to the public.” This is some distance from active public engagement in risk deliberation (cf. Fischer, 2000). Egan never quite shows Commoner distinguishing it from the grotesquely technocratic package of “acceptable risk” principle plus expert quantitative risk assessment plus expert cost-benefit analysis that came to dominate government regulation of industrial chemicals in the 1980s.

Given how provocatively Commoner’s “apparatus” represents central concerns of STS—the thoroughly social character of science and technology—it is remarkable how infrequently scholars working in this area have examined his efforts and mobilized his ideas.

Egan’s rich biography sent me thumbing through the indexes of books on my shelves. Commoner’s ideas had long stuck me as paralleling some of the best, most progressive thinking in STS. Feenberg (1999) has grappled extensively with Commoner, but I realized I did not know how Commoner’s writings have been reflected in—and have inflected—the broader STS literature. Remarkably little, it would seem.

Commoner’s understanding of the urgent need for vigorously democratic means of steering industrial technology resonates deeply with pivotal works of Winner (1978), Morone & Woodhouse (1986), Selove (1995), Sarewitz (1996), and Kleinman (2000), yet I could not remember seeing these scholars offer him as an exemplar, or examine his cam-
campaigns as case studies, or draw on his ideas. Perusing indexes, I now realized that only one of these books—Morone & Woodhouse’s Averting Catastrophe—gives Commoner a nod (and then but a single sentence citing the biologist’s lament about the seemingly suicidal bent of Western society’s technological development). Or perhaps Fischer’s (1990) and Martin’s (1996) investigations of the often corrosive, antidemocratic politics of scientific and technical expertise tap into a career that, in Egan’s words, “sought to reconnect professionalized science with the public interest”? Here again, surprisingly, the indexes do not whisper Commoner’s name. Or perhaps Collingridge (1980) and Perrow’s (1984) treatises on the characteristics of technosocial systems vulnerable to catastrophic failure? No.

I turned to the ISI Web of Science to see how often Commoner’s work is cited in peer-reviewed STS literatures. Post-normal science theory, which sees major environmental issues as requiring lay participation in science? It turns out that nine articles citing Funtowicz & Ravetz’s work (e.g., 1993) also reference Commoner’s (e.g., Cohen, 1997). Precautionary principle? Of more than 1,000 hits on the term, only five cite Commoner. Public ecology? None of the articles citing Robertson & Hull’s seminal work (2001; 2003) also cite Commoner. Or activism and science studies? None of the articles citing Woodhouse et al. (2002) cite Commoner. Even the broadest nets provide paltry returns: As of October 2009, Commoner had been cited only seven times in Bulletin of Science, Technology, and Society and four times in Social Studies of Science. Remarkably, he has never been cited in Science, Technology, and Human Values.

Egan is certainly correct that “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.” But his account ultimately sheds too little light on the nature of the fostering and the degree of influence beyond 1980. Regrettably, Commoner’s influence in this period has been a good deal less obvious, less direct, less decisive than I, and, I suspect, Egan, wish it had been. Taking Commoner’s social critique and political prescription to heart might have helped give the movement the grit needed to remain coherent, competent, and effective during decades of antienvironmental backlash. Instead, Commoner’s message was heard at best only in the movement’s margins—in the grassroots toxics and environmental justice movements—and today we are left with what Egan calls “the tragedy of this narrative…the breadth of environmental issues [Commoner] addressed that remain not just historical artifacts but ongoing contemporary problems.”

Meanwhile, STS’s overall failure to acknowledge or even, seemingly, to care much about Commoner no doubt is in part a function of the field’s unfortunate political quiescence (see Martin, 1993; Woodhouse et al. 2002). Commoner’s unapologetic socialism and commitment to democratic reconstruction of technology decision making perhaps leave him largely invisible in a field that has come of age in the post-Reagan era and has shown itself preoccupied with deconstruction.

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Commoner’s core contribution, Egan writes, was the development of a “new apparatus” that attempted to unite science, environment, and democracy to address the emergence of new challenges in the post-World War II United States. Four pillars supported this apparatus: dissent, information, dissemination (of information), and risk. According to Commoner, scientists (as citizens and as agents for democracy) had an obligation to dissent, to challenge conventional thinking. Through dissent, scientists would ply their trade in ways that increased debate. To encourage these debates, scientists ought to seek out (through research) additional pertinent information. The result must then be disseminated to everyday citizens as a way of empowering them with the information and perspectives science offers. Equipped with the power of information, citizens can participate actively in deciding what sorts of risks they might be willing to accept (rather than having that calculation done for them). In more general terms, it is easy to see how this apparatus would strengthen democratic ideals and place new concerns about technology, environment, and health squarely within the purview of a civil society. Citizens, empowered by scientists (who are willing to break with the status quo) with information, become more active, which yields a stronger democracy. It is a lovely picture. But is it possible? And if it is, would we want it?

I am going to ignore for the moment some of the more contextual issues that arise when thinking about scientists in the post-war period and their search for a new role in an atomic age. Rather, I want to focus on information and its dissemination as a tool for strengthening democracy, especially in an age of risk. To switch structural metaphors just a bit, we might consider information the keystone of Commoner’s new apparatus. Dissent and participation become more powerful when brought together through information. Commoner, as Egan demonstrates, saw scientists providing this crucial piece through the application of science to pressing social needs and the dissemination of results to audiences broader than the community of peers. The case of atmospheric testing might be willing to accept (rather than having that information), and risk. According to Commoner, scientists (as citizens and as agents for democracy) had an obligation to dissent, to challenge conventional thinking. Through dissent, scientists would ply their trade in ways that increased debate. To encourage these debates, scientists ought to seek out (through research) additional pertinent information. The result must then be disseminated to everyday citizens as a way of empowering them with the information and perspectives science offers. Equipped with the power of information, citizens can participate actively in deciding what sorts of risks they might be willing to accept (rather than having that calculation done for them). In more general terms, it is easy to see how this apparatus would strengthen democratic ideals and place new concerns about technology, environment, and health squarely within the purview of a civil society. Citizens, empowered by scientists (who are willing to break with the status quo) with information, become more active, which yields a stronger democracy. It is a lovely picture. But is it possible? And if it is, would we want it?

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1 There are certainly other places to explore these issues. For an overview, see Moore (2008). The more general questions about the role of science and scientists in a democracy have roots in Merton’s (1942) essay on the topic and extend through to present debates about what role experts and scientists can/might/ought to play in a functioning democracy (see, e.g., Jasano, 1994).
around the country) effectively demonstrated the promises and problems with this approach. Citizens did indeed mobilize when equipped with the information disseminated by Commoner and his colleagues. But these citizens could not simply speak (scientific) truth to power; it turned out power had its own (scientific) truths.

I do not want to argue that Commoner did not understand or even perceive that there would be problems with the application of this apparatus for using science to strengthen democracy. But in taking seriously the subtitle to Egan’s book, I want to think critically about how exactly Commoner refashioned environmentalism in this country. According to Egan’s telling, Commoner believed that the key to action (whether through dissent or cooperation) came in the form of information. Implicit in this construction, however, is the assumption that scientific information could act as a neutral arbitor; that with it we as citizens could indeed speak truth to power. And yet much of Commoner’s career was spent in grand debate with scientists over the very issue of whose science was true and the entangled politics of what each truth might mean. Rather than being resolved, the debates raged on seemingly without end.

Two important interrelated results follow from these debates. First, as Moore notes in her study of science and politics in this era, science became a tool to be plied by nonscientists as well. Politicians, too, could draw on the power of an objective science to make truth claims. Second, scientific information became the basis for our thinking about health, the environment, and risk. Regulation became a strictly scientific matter, dedicated largely to three of the four pillars: information, dissemination, and risk calculation. Citizens attempted to become citizen-scientists to better participate in the great debates. Industry, too, noticed what was happening and changed tack. They began fighting fire with fire. “Doubt” became a crucial role in the larger environmental movement as well as the environmental justice and health movements. But has it also created an environmental movement that perpetuates a disembodied and detached experience of our environment? I cannot help but think of an organization like 350.org in this context, which seeks to draw attention to climate action through the promotion of 350 parts per million of carbon dioxide as the maximum capacity of our atmosphere. I shudder at the idea that all of the things that climate change stands for—rising sea levels, shifting winds, altered biota, changes in the availability of water resources, mass migration—can somehow all be represented by a number: 350. The number, like so much of the science in the environmental movement, flattens the terrain of politics, geographies, economies, and justice. These features cannot be represented in numbers—they are the unquantifiable that have been labeled irrational and therefore unnecessary. I get the sense reading this book that this is not where Commoner intended us to end. Perhaps now we can begin thinking about how to remake the environmental movement again.

Commoner’s role in the construction of the modern American environmental movement is largely unsung. Egan places him squarely within a context that has long missed one of the most important transitions in environmentalism in the United States: the scientization of the movement. Commoner’s work helped to create a foundation for the growth of the types of citizen science that have come to play such a crucial role in the larger environmental movement as well as the environmental justice and health movements. But has it also created an environmental movement that perpetuates a disembodied and detached experience of our environment? I cannot help but think of an organization like 350.org in this context, which seeks to draw attention to climate action through the promotion of 350 parts per million of carbon dioxide as the maximum capacity of our atmosphere. I shudder at the idea that all of the things that climate change stands for—rising sea levels, shifting winds, altered biota, changes in the availability of water resources, mass migration—can somehow all be represented by a number: 350. The number, like so much of the science in the environmental movement, flattens the terrain of politics, geographies, economies, and justice. These features cannot be represented in numbers—they are the unquantifiable that have been labeled irrational and therefore unnecessary. I get the sense reading this book that this is not where Commoner intended us to end. Perhaps now we can begin thinking about how to remake the environmental movement again.

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2 See Mooney, 2006.
Rejoinder from the author

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After World War II, American environmentalism shifted from collective action to protect nature from civilization to a movement whose primary goal was to save civilization. Put another way, the technological advances and new threats to life on Earth that emerged during and immediately after the war challenged American society to recognize that human bodies and human health were ecological landscapes that required protection. By and large, this mentality continues to drive much of the environmental movement into the 21st Century. Its aims are most explicitly visible in efforts to control climate change, concerns about toxics, and activism regarding environmental justice. Even at the grassroots level, scientific information—most of it quite technical—has permeated throughout the activities that drive American environmentalism. The ethics and aesthetics that motivated earlier generations of conservationists and preservationists (an awkward dichotomy) are not wholly absent, but activists have learned that science and scientific authority are the indices for the cognitive mapping of our environmental crisis, and if they are to be heard (and realize change) they must engage with this vocabulary. I submit that Barry Commoner’s contributions in making scientific information accessible to public audiences were instrumental in transforming American environmentalism. Some years removed from writing Barry Commoner and the Science of Survival: The Remaking of American Environmentalism, I suspect that I would now be more forceful in arguing that this scientific activism is a critical and underappreciated feature of the history of environmentalism and—just as importantly—one of the most significant developments in the history of science since World War II.

As I write, winter is rolling in and snow flurries are swirling off the escarpment visible through my office window. My students are headed in to write a final exam for my undergraduate course on science and technology in world history. I have been stalling on writing my thoughts on Jeff Howard’s and Jody Roberts’s engaging and incisive comments on my book. My procrastination has a lot to do with the book, Commoner’s place in history, their reflections on both, and the difficulties of crafting a response for a journal whose title begins with Sustainability. Downstairs, my students are probably cursing my good name as they open their exam booklets, but they serve—indirectly—as the inspiration for my response. Having previously addressed the military-industrial complex, the bomb, and the Cold War’s influence on science and engineering, and having stressed the manner in which knowledge reflects the material circumstances of its conception—Thorstein Veblen’s astute observation—I felt as though the course needed to conclude with a more cheering suggestion of how science and society interact. My last lecture introduced Commoner’s science of survival. Here, I intimated, was science not removed from society, but rather science and scientists firmly entrenched in the real world implications of their work. This was interested science. It is a real facet of the contemporary scientific landscape.

What first interested me about Commoner was his articulate recognition of this turning of science toward social engagement and how he mobilized his political energies to address it. What Commoner identified and cogently communicated was a dynamic shift in the manner in which humans interacted with the physical environment. Whereas the environment had typically been regarded as an infinite diluent for the hazardous products of human activity, the intensity and form of technological activity after World War II put into question the total environment’s capacity as an infinite reservoir. From nuclear fallout to the products of the petrochemical industry, the nature of the pollutants threatening the human habitat was altered. “In the past,” Commoner wrote in a grant application that would yield inaugural funds to build the Center for the Biology of Natural Systems, “apart from relatively localized inorganic industrial pollutants, human impact on the environment was due almost exclusively to human biology and was represented by the common products of animal excretion: CO₂, nitrogenous wastes, and the concomitant microbial flora” (Commoner, 1965). While these pollutants constituted natural wastes and were subject to biological degradation, the latest synthetic materials were new to the biosphere. This situation constituted a radical transformation in technological systems and, necessarily, an important turning point in how we need to think about nature and sustainability.

One of my enduring regrets with the book is that I did not spend nearly enough time unpackaging the

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role and efforts of Commoner’s Center for the Biology of Natural Systems. The history of the Center constitutes an important case study for the melding of science and activism, as well as a valuable lens for examining the science of the environmental crisis. In the early 1960s, a congressional act made funds available to the Public Health Service to establish ten centers for research on environmental problems related to human health. In spite of several preceding applications from numerous universities, the Center for the Biology of Natural Systems was the first (and only) center to receive funding before the budget was ultimately eliminated. In September, 1965, Commoner submitted a funding proposal to the Public Health Service for the creation of a scientific research center that would tackle the growing number of environmental threats to human health. Commoner was listed as the principal investigator of a team of St. Louis-based collaborators on the grant, which had a budget of $3.6 million dollars over six years. Collaborators came from Washington University’s departments of botany, zoology, physics, and chemistry, and also the university’s Medical School, the St. Louis Zoo, and the Missouri Botanical Garden. As Commoner recalled, “The proposal represented a collaboration rather than an individual university-based or discipline-based activity with an elaborate program aimed at the complexities of the natural biological systems in which nature functioned [and that] required the attention of basic scientific research” (Commoner, 2007).

The proposal not only reflected the program’s environmental imperatives, but also the importance of public health research in the scientific climate of the time. Such research, the application asserted, was a scientific orphan. The Public Health Service certainly thought so; more to the point, their attempt to develop a comprehensive research program on the environment was something no government agency had attempted. Commoner and his colleagues proposed to connect to the rapidly developing modernization of biological research—including molecularly oriented research—with research in chemistry and physics. In its formation and mission, then, the proposed research was very intentionally multidisciplinary—or, as Commoner insisted, adisciplinary, because, he argued, traditional academic disciplines were not independently equipped to tackle environmental problems. During a period when scientific investigations tended toward greater reductionism, the more wide-ranging adisciplinary of the Center’s vision demonstrated a novel reading of the nature of environmental problems. I should stress that this is not ecology, but rather a science of the total environment that resisted being limited to ecological or toxicological methodologies.

The application also outlined the rationale for the center’s proposed name. The Center for the Biology of Natural Systems was a deliberate response to the increasing molecularization of the biological sciences, which, Commoner and his colleagues argued, stressed extractive parts of living systems, but not the living systems themselves. “The dependence of human health on the environment is an expression of a basic condition of life,” the grant stated, “that every organism functions as part of a natural system which includes other individuals of the same species, a wide variety of other organisms, and their non-living surroundings” (Commoner, 1965). In addition to situating the role of public health within a more traditional environmental rubric, the Center for the Biology of Natural Systems also played a vital role in the larger history of the creation of a public, or vernacular, science after World War II. Commoner and others had already developed a fairly sophisticated vernacular science in their work against fallout from above-ground nuclear weapons testing, but the efforts within the Center constituted a more evolved and accepted branch of this work. If Commoner and others who dissented against the American atomic bomb tests had been outsiders in the late 1950s, Commoner’s environmental work in the 1960s, under the guise of the Center for the Biology of Natural Systems, was very much a part of the mainstream, or popular, environmental initiative. This is an important story that deserves further study.

My extended introduction means to assert the motivations that drove much of Commoner’s environmental work. While it does not respond directly to a number of Howard’s and Roberts’ more specific observations, I believe it sets the scene for my remarks below and points to an important moment in the history of sustainability that warrants careful attention. In the remainder of my reflections, I aim to do three things: examine Commoner’s place in the literature, consider Commoner’s influence after 1980, and address the relationship between science and activism.

Commoner’s Place in the Literature

In noting Commoner’s relative absence from the historical and social science literature on science and the environment, Jeff Howard identifies a point that provided me with many sleepless nights while working on the book. Why is it the case that Commoner is not cited more frequently? As Howard observes, he certainly ought to be. There are a number of potential explanations for Commoner’s relative invisibility:
1. Commoner was not all that important to the larger narrative of science, environment, and activism in the post-World War II period.

2. Commoner was the product of an older generation and an older way of seeing things that resonated less with scholars working at the very end of the twentieth century and the beginning of the twenty-first.

3. For a variety of reasons, Commoner’s ideas failed to capture the public and scholarly imagination over the long term.

4. Commoner’s politics and his radical, confrontational approach alienated many would-be allies.

5. Commoner never was, and never saw himself, as the kind of public intellectual actively providing a template for thinking about environmental issues in a scholarly format; his interests involved the real world and effecting real change.

I suspect that each of these explanations holds some kernel of truth, though I would be inclined to put much heavier emphasis on the bottom of the list. Commoner’s socialism was not popular within many environmental circles of the 1960s, 1970s, or 1980s. While many of his criticisms and positions were warmly received, his radical, leftist politics consistently made him a rank outsider among the more mainstream and liberal-minded leaders of the bigger environmental organizations. This occasionally led to confrontation (best remembered, perhaps, in his bitter dispute over population with Paul Ehrlich), and Commoner was rarely one to back down. More importantly, however, like most scientists involved in environmental politics, Commoner was not terribly interested in social theory, and contributing to it did not appeal. He saw himself as a problem solver, not a paradigm or rule maker. Because he had no interest in engaging with the social science literature, his ideas may have gained less purchase with those scholars during a period when their studies of science were in their initial ascendancy. This is, however, a far from satisfactory answer to an intriguing question. The real answer is: I do not know. Commoner’s Four Laws of Ecology are continually invoked, his strong feelings about population and his debate with Paul Ehrlich are occasionally recalled, but little else of his work and efforts are remembered.

Commoner’s Influence After 1980

Howard also asks what happened to Commoner after 1980. Following his campaign for the presidency in 1980, his interaction with the environmental movement seems at best peripheral. Understand, first, that by 1980, Commoner was already in his 60s; he retired from Washington University and moved the Center for the Biology of Natural Systems to Queen’s College in Flushing, New York. The publication and archival record demonstrate that the move permitted Commoner to actually increase his productivity in terms of urban issues. But my treatment of Commoner suggests a fading from the center of the larger environmental landscape. In the book, I point to the continued importance of his activism and the consistency with which Commoner continued to identify what he saw as the root problems of the environmental crisis. Furthermore, if the focus of American environmentalism had shifted after World War II, its practice changed dramatically upon Ronald Reagan’s arrival in the White House in 1980. Personnel changes in all the major environmental organizations brought about a markedly different kind of activism and appealed to a different kind of environmentalist. Lobbying and litigation moved people and priorities to Washington and away from the kinds of grassroots advocacy that Commoner championed. These teams had their own scientists and less interest in local communities; they needed money, not feet in the streets, and their flyers and fundraising reflected those circumstances.

Although Commoner’s influence waned after the 1970s, his activity continued unabated. He carried on working with smaller communities on various issues that affected them: dioxin, the siting of waste and power plants, recycling. The world of environmental politics might have altered, but Commoner and his practice changed little. He remained dedicated to the dissemination of accessible scientific information to the public that needed it. Sticking to his guns in the 1980s, however, now seems justified in light of the rise of environmental justice activism in the 1990s. It would be awkward to assert that Commoner anticipated the environmental justice movement, but even a cursory reading of The Closing Circle—not to mention much of Commoner’s work before that—shows the importance of social justice and citizen empowerment in environmental activism. While Commoner’s work in the 1980s and 1990s did not receive as much mainstream attention as his earlier efforts, his ideas about social justice became distinctly more palpable. And, in accordance with the new environmental justice movement, Commoner’s work maintains its grassroots and information-based themes.

Moreover, I do not think I claimed (or certainly did not mean to claim) that Commoner was the apotheosis of American environmentalism since the late 1950s. Far from it. The Jekyll and Hyde nature of this part of my narrative might obscure the bigger efforts of the work, insofar as I remained interested in the trajectory of American environmentalism in the post-World War II landscape, while being curious to see
what would happen if one wrote Commoner centrally into this narrative. What I think emerges in this final chapter is a variety of intersecting and conflicting paths between mainstream and grassroots environmentalism and parallel paths between Commoner’s efforts and the movement for environmental justice.

The Relationship Between Science and Activism

Jody Roberts asks the intriguing question: are Commoner’s views on encouraging public participation in science actually a good thing? He points to various examples of the democratization of science as having Babelian consequences. Whereas science has traditionally been regarded as an authoritative tool for providing solutions to many knowledge-based problems, it has been less successful in the environmental context because competing interests from local communities, industrial producers, and legislative bodies have introduced and emphasized incommensurable motivations and priorities. This problem preceded the emergence of public interest science, but Roberts suggests that politically engaged scientists like Commoner contributed to the relative cacophony of voices in environmental debates, which ushered in a period of what Silvio Funtowicz & Jerome Ravetz (1992) have called postnormal science, where knowledge is “uncertain, values in dispute, stakes high and decisions urgent.” Postnormal science reflected the new nature of scientific inputs to policy processes.

Looking at the bigger picture, scientific communities have been pressed into action to weigh in—quickly—on the issues of the day, from nuclear fallout to global warming. And let me stress “quickly;” the project of this postnormal science—a derivative of Thomas Kuhn’s paradigm-based normal science—is not to collect and present definitive knowledge, but rather to function within a highly complex network of policy-making interests.

In an important 1985 article on the development of conservation biology, Michael Soule discussed the precarious nature of what he called “crisis disciplines,” where, he claims, “one must act before knowing all the facts.” According to Soule, conservation biology is one of these disciplines. And this is telling. He writes: “crisis disciplines” require more than “just science.” In fact, they are “a mixture of science and art, and their pursuit requires intuition as well as information” (Soule, 1985). And this can be problematic. For example, the quality assurance pivotal to the success of the scientific enterprise now demands an extended peer community consisting not just of experts, but of all stakeholders. In addition, in the new, postnormal science, scientific findings constitute only one kind of evidence; traditional, empirical results are married with local knowledge, community surveys, leaked documents, and investigative journalism.

As I understand it, this is the problem Roberts identifies with Commoner’s position. And it’s a valid concern. But what are the alternatives? As Brian Wynne & Sue Mayer (1993) correctly assert: “Where the environment is at risk, there is no clear-cut boundary between science and policy.” One of Commoner’s most strongly held beliefs was the notion that scientific experts had no moral authority to determine what constituted acceptable risk to a larger public. That was a policy issue and one that required the input and participation of an informed public. But that is not usually/ever what happens. Rather, Ravetz (1999) observes a curious inversion of the dependence on “hard,” objective scientific facts and “soft,” subjective value judgments: “All too often, we must make hard policy decisions where our only scientific inputs are irremediably soft.” In that context, works such as Chandra Mukerji’s (1989) A Fragile Power: Scientists and the State identify an ominous and complex interdependence, wherein scientists assume the role of highly skilled experts retained to provide legitimacy to government policies.

This is what the more idealistic motivations behind the science information movement were railing against and why Commoner and others worked to provide citizens with the technical information necessary for informed public participation in debates over environmental problems. If science and policy are inextricably linked, then the public needs to be involved. To Funtowicz & Ravetz (1992), this is the only way science can be redeemed in the public spotlight; postnormal science is the lone portal through which trust in science—deeply eroded by the atomic bomb, the array of toxic pollutants that infiltrated the physical environment since World War II, and the rampant capture of science by globalization—can be restored. Moreover, the increasing dependence on “soft” scientific knowledge raises some intriguing social questions about uncertainty and scientific authority. To some, this might actually be a good thing. Indeed, Ulrich Beck raises a potential boon for scientific uncertainty. “The exposure of scientific uncertainty,” he writes, “is the liberation of politics, law, and the public sphere from their patronization by technocracy” (Beck, 1992).

Public science has and will continue to foster greater scientific literacy and a more informed public. My interest here and in the book is not to pass judgment on the moral nature of postnormal science, but rather to recognize its mechanisms as a prevalent feature of the American scientific landscape after World War II and to examine Commoner’s historical significance within that context. The complexity inherent in environmental disputes since World War II
rested on the uncertainty and controversy surrounding the science designed to resolve disagreements. Commoner’s historical significance stems precisely from his early recognition of the importance of translating or conveying that uncertainty to the public as essential in assuring continued public participation in environmental issues.

In Roberts’ rereading, science is necessarily a top-down venture, which requires a more centralized authority to avoid the noise of too many dissenting viewpoints. For the reasons noted above, Commoner would resist this claim, and so would I. While engineering requires this kind of central control, science and the growth of scientific knowledge have historically flourished in periods and places where fewer impositions influenced its progress. Going back into ancient history, the Ionian Coast exhibited a kind of openness and tolerance that encouraged the flow of ideas. Similarly, much of the creative work during the Scientific Revolution was the product of intellectuals working in collaboration, but removed from the political upheavals of their day. The close working relationship between science and policy to which Roberts alludes is a fairly recent development, which can be effectively traced to World War II and the American government’s growing investment in research and development (Egan, 2007). Commoner would be quick to note that this relationship is what caused the environmental crisis and is hardly the way to solve it. He concluded The Closing Circle with this astute observation: “sweeping social change can be designed only in the workshop of rational, informed, collective social action” (Commoner, 1971). More on this in my concluding remarks.

I would also challenge a number of Roberts’ contentions concerning Commoner’s intents and actions. Firstly, while Commoner was an experienced political animal and relished debate, I do not think he (much less my book) spent inordinate amounts of time in conflict with other scientists. Commoner butted heads with a number of prominent figures and frequently refused to back down (he called it “principled arrogance”), but these are largely side notes to his career and activism, not their core.

Further, I doubt Commoner’s advocacy of scientific information as a neutral arbiter was any more than a rhetorical flourish; he was very conscious of how science and expertise implied a level of social authority and sought to use that notion as an empowering tool for a confused and scared public. His bigger intent was to generate broader interest and action. Roberts refers to my discussion of the Baby Tooth Survey that analyzed deciduous teeth in the St. Louis area for strontium-90 as a method of determining the risks inherent in aboveground nuclear weapons testing (Egan, 2007). Citizens did mobilize. A nuclear test ban treaty was brought about, in large part, by the pressure that concerned citizens imposed on governments. But there was also something else. The generation of children born during the 1950s, those whose teeth served as the materials for the baby tooth survey, became the most environmentally engaged generation in American history. I do not mean to pretend that Commoner’s activism fostered this (and I certainly could not prove it), but during the 1960s, 1970s, and 1980s, scientific knowledge played an ever-increasing role in environmental debates and the public followed along more avidly than they had before.

In closing, let me draw from Steven Shapin & Simon Schaffer’s (1985) seminal text on natural philosophy in the Scientific Revolution, Leviathan and the Air Pump: Hobbes, Boyle, and the Experimental Life, the publication date of which 1985 coincides neatly with the decline of Commoner’s influence:

Now we live in a less certain age. We are no longer so sure that traditional characterizations of how science proceeds adequately describe its reality...Our present-day problems of defining our knowledge, our society, and the relationships between them centre on...dichotomies between the public and the private, [and] between authority and expertise...We regard our scientific knowledge as open and accessible in principle, but the public does not understand it. Scientific journals are in our public libraries, but they are written in a language alien to the citizenry. We say that our laboratories constitute some of our most open professional spaces, yet the public does not enter them. Our society is said to be democratic, but the public cannot call to account what they cannot comprehend. A form of knowledge that is the most open in principle has become the most closed in practice. To entertain these doubts about our science is to question the constitution of our society.

Barry Commoner spent a career reveling in questioning the constitution of our society, and the larger science information movement saw as its guiding principle an approach to breaking down the barrier between expertise and the public. Any successful endeavor at realizing a more sustainable planet involves work, collaboration, and action at this intersection.
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