

Rachel Carson's Ecological Critique

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Below are a few excerpts from the full article found:

<http://monthlyreview.org/2008/02/01/rachel-carsons-ecological-critique/>

Rachel Carson was born just over 100 years ago in 1907. Her most famous book *Silent Spring*, published in 1962, is often seen as marking the birth of the modern environmental movement. Although an immense amount has been written about Carson and her work, the fact that she was objectively a “woman of the left” has often been downplayed. Today the rapidly accelerating planetary ecological crisis, which she more than anyone else alerted us to, calls for an exploration of the full critical nature of her thought and its relation to the larger revolt within science with which she was associated.

Carson was first and foremost a naturalist and scientist. But she was propelled by her understanding of the destructive ecological forces at work in modern society into the role of radical critic. A recent biography attempts to capture this in its title: *The Gentle Subversive*. The principal causes of ecological degradation, Carson insisted, were “the gods of profit and production.” The chief obstacle to a sustainable relation to the environment lay in the fact that we live “in an era dominated by industry, in which the right to make a dollar at any cost is seldom challenged.”¹

Silent Spring was directed against the chemical industry and its production of deadly pesticides. Carson combined the best scientific information then available with the skills of a great writer, and had an extraordinary effect in raising public concern over this issue. Yet, despite a number of victories, Carson and those who followed in her footsteps lost the war against synthetic pesticides, which she preferred to call “biocides.” Although she conceded that there were some situations where the application of such chemicals might be appropriate, she strongly believed “the elimination of the use of persistent toxic pesticides should be the goal”—as stated in the 1963 report on pesticides of the President’s Science Advisory Committee, which she regarded as a “vindication” of her views. Chemical control needed to be replaced wherever practicable by biological control (organic methods relying on natural enemies of the pests). She called this, in the concluding chapter of her book, “The Other Road.” Nevertheless, except for the banning

of a few of the most deadly toxins such as DDT, the chemical industry triumphed, seeing an expansion of the production of this class of chemicals.²

This growing use of synthetic pesticides had nothing to do with the rational application of science. Although the chemical industry and their allies attempted to demonstrate that Carson made mistakes and exaggerated the dangers of pesticides in her arguments, her research has generally stood the test of time. Moreover, the questions she raised about the accumulation of these dangerous chemicals in living organisms are today even more relevant. She was especially concerned about the long-term, widespread effects of such biocides, which were being used in ever greater quantities, were persistent in the environment, and drifted uncontrollably, often concentrating in organisms in areas far removed from the point of introduction. She accurately predicted that dependence on synthetic pesticides would result in a pesticide treadmill as organisms evolved rapidly into more resistant forms requiring either higher doses or new biocides. "The chemical war," she wrote, "is never won, and all life is caught in its violent crossfire." By the late 1980s the production of pesticide active ingredients, much of it destined for U.S. farms, had increased to more than twice that of the early 1960s when Carson wrote *Silent Spring*. In 1999 over 100 million U.S. households applied some type of pesticide to their homes, lawns, and gardens. Many such chemicals on the market today have not been adequately tested. Meanwhile U.S. agribusiness has continued to produce and export banned pesticides to other countries. Some of the food imported to the United States from abroad is grown using these substances.

In the last decade and a half, the main focus of concern with regard to pesticides and related chemicals has shifted from cancer and the potential for genetic mutations—both of which remain among the biggest dangers of these chemicals—to the disruption of the endocrine system, affecting a myriad of bodily functions. Numerous pesticides mimic the female hormone estrogen, and research has suggested that they can reduce fertility, produce testicular and breast cancer, and malform the genital organs. Serious questions are being raised about the complex and still little understood effects of these chemicals on animal and human reproductive systems. Between the early 1970s and the early 1990s the incidence of testicular cancer in the United States increased by about 50 percent; while the last half-century or so has seen a drop worldwide in sperm counts by about 50 percent. Attention has also turned to other synthetic chemicals introduced into the environment in countless products. Over seventy thousand synthetic chemicals are used in commerce, while only 10–20 percent of these chemicals have been systematically tested. The failure adequately to test or limit the use of

such chemicals more than forty-five years after the publication of *Silent Spring* makes Carson's book of continuing importance for that reason alone.³

But Carson's attack on synthetic pesticides is not her most notable achievement. Rather it is her wider, ecological critique challenging the whole nature of our society that is so important today. Carson is better understood if we recognize that she was not simply an isolated figure as is often supposed, but was part of a larger revolt among scientists and left thinkers in the 1950s and '60s arising initially from concerns over the effects of nuclear radiation. Alarm about aboveground nuclear tests and the harmful effects of radiation, coupled with fears of nuclear war, spurred scientists, emanating primarily from the left, to raise searching questions about the destructiveness of our civilization. From this work, the modern ecology movement emerged.

Radiation and Ecology

Carson's discussions of the effects of pesticides on living things drew heavily upon earlier discoveries by scientists regarding radiation. She repeatedly referred in *Silent Spring* and elsewhere to the breakthroughs in the 1920s of U.S. geneticist H. J. Muller, who first discovered that exposure of organisms to radiation could generate genetic mutations. As she explained to the National Council of Women of the United States in October 1962, two weeks after the publication of her book:

When I was a graduate student at Johns Hopkins University, studying under the great geneticist H. S. Jennings, the whole biological community was stirring with excitement over the recent discovery of another distinguished geneticist, Professor H. J. Muller, then at the University of Texas. Professor Muller had found that by exposing organisms to radiation he could produce those sudden changes in hereditary characteristics that biologists call mutations.

Before this it had been assumed that the germ cells were immutable—immune to influences in the environment. Muller's discovery meant that it was possible for many, by accident or design, to change the course of heredity, although the nature of the changes could not be controlled.

It was much later that two Scottish investigators discovered that certain chemicals have a similar power to produce mutations and in other ways to imitate radiation. This was before the days of the modern synthetic pesticides, and the chemical used in these experiments was mustard gas. But over the years it has been learned that one after another of the chemicals

used as insecticides or as weedkillers has power to produce mutations in the organisms tested or to change or damage the chromosome structure in some other way.4

As Carson observed in *Silent Spring*, “among the herbicides are some that are classified as ‘mutagens,’ or agents capable of modifying the genes, the materials of heredity. We are rightly appalled by the genetic effects of radiation; how then, can we be indifferent to the same effect in chemicals that we disseminate widely in our environment?”5

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When the cloud of secrecy surrounding the fallout problem lifted in 1954, the scientific community was able to study the extent of environmental degradation and contamination caused by nuclear weapons tests. Such work required the expertise of biologists, geneticists, ecologists, pathologists, and meteorologists, who explored the effects of radiation on plants and animals, as well as the movement of radioactive materials through the atmosphere, ecosystems, and food chains. Nuclear testing had joined the world’s population in a common environmental fate, as radioactive fallout was distributed globally by wind, water, and living creatures. Human-made radioactive isotopes, such as strontium-90, iodine-131, cesium-137, and carbon-14, were introduced into the global environment, and from this point on, became part of the bodily composition of humans and all life. Different radioactive elements had distinct properties and posed unique threats to people and the environment. Plants and animals took up such materials, which were passed on through the food chain. Strontium-90 was built into children’s bones and teeth, cesium-137 concentrated in muscles, and iodine-131 was embedded in thyroid glands, each increasing the risk of cancer. Linus Pauling pointed to the myriad biological threats associated with carbon-14 lodged in all the tissues in the body.

In studying the effects of radioactive substances on food chains, the concepts of bioaccumulation and biological magnification were established—later to become intimately identified with Carson’s *Silent Spring*. Bioaccumulation refers to a process whereby a toxic substance is absorbed by the body at a rate faster than it is lost. For instance, strontium-90 is a radioactive isotope that is chemically similar to calcium and can accumulate in the bones, where it can cause genetic mutations and cancer. Biological magnification occurs when a substance increases in concentration along the food chain. An example of this occurred when radionuclides discharged into the Columbia River in trace amounts from the Hanford nuclear facility in Washington State were discovered to increase in order of magnitude as they were passed along in the food chain.

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Carson and Ecosystem Ecology

Another very important influence on Carson's environmental thinking was the rise of ecosystem ecology and new developments in evolutionary theory in her day. Ecology at this time was still a young field. The key concept of "ecosystem" had been introduced only a few decades prior in 1935 by the British ecologist Arthur Tansley. Tansley was a Fabian-style socialist who had studied under the leading Darwinian biologist of his day, E. Ray Lankester. Lankester was an adamant materialist, an early, sharp critic of ecological degradation, and a young friend of Karl Marx—present at Marx's funeral.

In the late 1920s and '30s, when Tansley was writing, the new field of ecology was dominated by teleological conceptions (emphasizing the purposiveness of nature, emanating from final causes) associated with the work of Frederick Clements in the United States and Jan Christian Smuts and his associates in South Africa. (Smuts, who served as South African prime minister, was one of the principal figures in establishing the preconditions for the apartheid system.) Incensed by the idealistic/racist interpretations of ecology propounded by Smuts and his followers, Tansley developed the concept of "ecosystem" as a materialist alternative to Smuts's teleological "holism." "Though the organisms may claim our primary interest," he wrote, "we cannot separate them from their special environment, with which they form one physical system....These *ecosystems*, as we may call them, are of the most various kinds and sizes. They form one category of the multitudinous physical systems of the universe, which range from the universe as a whole down to the atom." Tansley was deeply concerned with "the destructive human activities of the modern world." "Ecology," he argued, "must be applied to conditions brought about by human activity," and for this purpose the ecosystem concept, which situated all life within the larger material environment and penetrated "beneath the forms of the 'natural' entities," was the essential form of analysis.¹⁰

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For Carson, the ecosystem concept emerged as the basis of a radical challenge to the notion of the human domination of nature. The modern discovery of "the fact that man, like all other living creatures, is part of the vast ecosystems of the earth, subject to the forces of the environment," she argued, was on a par with (and ultimately inseparable from) Darwin's theory

of evolution. The obvious corollary of such an evolutionary-ecological view is that “man is affected by the same environmental influences that control the lives of all the many thousands of other species to which he is related by evolutionary ties.”¹²

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Ecology as a Radical Force

Carson's intense study of ecosystem ecology in the context of her work on *Silent Spring* heightened this materialist understanding and turned it into a radical force. At the time of her death she had a book contract to undertake a philosophical examination of ecology and she was collecting material for a scientific study of evolution. The two subjects were obviously connected in her mind and were undoubtedly to form the basis of a thoroughgoing critique of the present human relation to the earth.¹⁵

This put her in direct conflict with the powers that be. For the dominant economic interests, as her editor and biographer Paul Brooks observed, “the really scary thing” was that Carson “was questioning the whole attitude of industrial society toward the natural world. This was heresy and this had to be suppressed.” Carson herself was well aware that her radical ecological perspective was placing her at odds with a system geared to expansion of private production at all costs. In the process of writing *Silent Spring* she studied John Kenneth Galbraith's *Affluent Society*, which had raised the question of private wealth and public squalor, i.e., the external diseconomies of the market system, whereby social and environmental costs were imposed on society and nature.¹⁶

In responding to the attacks on *Silent Spring*, Carson complained of the “enormous stream of propaganda” blocking rational science and ecological values. She railed against the tax subsidies given for corporate lobbyists, and attacked the large private grants to universities through which corporations tried to purchase a “scientific front” for their operations. Behind all of this lay the question she continually raised: “What happens...when the public interest is pitted against large commercial interests?”

Carson had no doubt that there was an irreconcilable conflict between economic and environmental interests within contemporary society. Thus she complained of the promotion of extreme “intensivism” in production in the search for greater profits, particularly as it related to the maltreatment of animals. The economic system, she emphasized in line with Rudd, was geared toward “overproduction” at the expense of the environment. In our society, dominated by material acquisition, life was destroyed because business was “blinded by the dollar sign.”

Indeed, "the modern world," she declared, "worships the gods of speed and quantity, and of the quick and easy profit, and out of this idolatry monstrous evils have arisen." She added that "the struggle against the massed might of industry is too big for one or two individuals...to handle"—a view that clearly called for the formation of an environmental movement to counter the power of industry.¹⁷

What appeared to anger the chemical industry more than anything else about Rachel Carson's book was that she chose to begin *Silent Spring* with a literary device: "A Fable for Tomorrow" the tale of "a town...where all life seemed in harmony with its surroundings," and which unthinkingly, almost unbeknownst to itself, introduced chemicals of destruction into its midst. For Carson "a grim specter" was haunting modern industrial, acquisitive society, threatening to silence the spring. Her fable was clearly "for tomorrow" in two senses: it represented both an unprecedented threat to all life, and the possibility of overcoming it. The worst society could do would be to stand still in the face of such a threat. Giving evidence of her broad progressivism, she wrote elsewhere: "the changes and the evolution of new ways of life are natural and on the whole desirable."¹⁸

Today many of the same problems that Carson pointed out persist, often in more potent forms. This has to be the case for a system that by its very nature must grow (at a rate exceeding population growth) in order to stay out of severe crises, and in which producing more and more profit is the motive force propelling the economy. An example of how economic priorities override ecological approaches can be seen in the case of strawberry growers in California, who can't make as much money if they rotate crops and take land out of strawberries. Thus, they "need" to use a biocide, methyl bromide (which also acts to deplete the protective atmospheric ozone layer at fifty times the level of CFCs), in order to kill soil-borne pests that would be well taken care of by a more ecological approach to growing strawberries. To give an idea of how significant the problem of pesticide use continues to be, in 2006 some 64 percent of the fresh produce and 59 percent of the processed fruits and vegetables tested by the U.S. Department of Agriculture contained detectable levels of pesticide residues.¹⁹

Likewise, producers of agricultural animals using factory farms in which animals are crowded together under inhumane conditions "must," we are told, routinely use antibiotics (a form of pesticide, of course) to try to keep the animals growing reasonably fast. This leads not only to antibiotic residue in meat but also to the development of antibiotic-resistant microbes. Raising animals in a less dense and more humane system, only using antibiotics when animals actually get sick, leads to higher production costs and hence is rejected by market principles—what

Carson called “the gods of profits and production.” Although there is a developing public interest in organically raised agricultural products and “humanely” raised animals these are still niche markets.

The U.S. government has been particularly sympathetic to the desires of business to maintain as free a hand as possible in continuing to introduce new chemicals into the environment. It has therefore opposed mandating the removal of potential hazards. As pointed out in a recent *New York Times* article: “The United States has held on to its original 30-year-old chemical regulatory systems, which make it difficult for agencies to ban chemicals or require industry testing. While the government has worked with the industry on a voluntary basis to study as many as 2,000 chemicals and phase out certain ones, it has required the study of only 200 chemicals and restricted the use of only 5 since 1976.”20

Beyond these persistent problems associated with the introduction of synthetic chemicals into our environment, there remains the wider set of ecological perils that Carson addressed. It was this larger ecological critique that challenged the whole nature of the modern production system that represented her most enduring contribution. Far from being the quiet, demure, establishment figure that we often hear of today, Carson in reality represented a defiant, radical voice. As a scientist and a writer she went beyond the bounds of what is allowed in “polite circles” and thus alerted and energized the public. When attacked by industry, she stood her ground, and went to the root of the issue. She urged us, and particularly those responsible for raising and educating children, to reject “the sterile preoccupation with things that are artificial, the alienation from the sources of our strength.”21

Carson spent most of her adult life discovering and lovingly describing the “sea around us.” But as her ecological critique developed, perceiving the destructiveness of the social encounter with the environment, she sought not merely to explain the world, but to change it.