

Course reserve:
<b>Methodologies of environmental analysis</b>
Yaakov Garb, 2002

## **Rachel Carson's *Silent Spring***

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[This essay appeared in the Fall 1995 issue of *Dissent* (pp. 539-546) as the first of a new series "Reconsiderations: looking back at books at books important in the intellectual and political history of the left." It is an abbreviated version of a talk given in the 1994-95 Social Sciences seminar series at the Institute for Advanced Studies (Princeton), and I am grateful to participants for their comments, as well as to Iain Boal, Leo Marx, Peter Taylor, Charles Weiner, Rosalind Williams, Anna Tsing, Barbara Keates, Barbara Goldoftas, Linda Lear, and Danny Faber. An expanded version of the essay appeared in David Macauley (ed.), *Minding Nature: The Philosophers of Ecology* (New York: Guilford, 1996). ]

Scattered reports of problems with pesticides had appeared in the technical literature from the fifties onwards, but it was only in 1962 that a wide-ranging critique of pesticides was published for a popular audience. Brought out by a major trade press, this book charted the tremendous increase in the production and use of these chemicals since WW2, and documented their failings. Focusing on chlorinated hydrocarbons and DDT in particular, it described their physiological effects, their impact on human health and wildlife, and the inadequacy of existing pesticide regulation. The book demonstrated how pesticides were not only harmful, but ultimately self-defeating, since pests soon developed resistance while beneficial insects and animals that helped keep them in check were killed. Further pesticide applications to counter a resurgence of the targeted species and infestations of new insects that weren't a problem before spraying began an escalating cycle. The book proposed replacing this hubristic attempt to master nature, which was destroying the earth's capacity to support human life, with a philosophy of wise management of ecosystems and the human future, and the development of ecologically sound biological control of pests. These changes, the author stressed, should not jeopardize nutrition and the American economy, and pesticides should not be banned, only used very selectively.

The book flopped. It receiving short negative reviews in the literary supplements of the New York Times and the Times of London, and not much else, and soon disappeared. I doubt many of you have heard of its author, Lewis

Herber, or remember its title, Our Synthetic Environment. A few months later, however, in three June issues of the New Yorker magazine and then in the fall as a book, Rachel Carson's critique of pesticides was published. Her Silent Spring contained in amplified form every one of the charges against pesticides I have just listed for Herber's work, but no substantially new ones. Yet Carson's critique created an immediate storm of media and soon governmental attention. There was much praise, as well as angry rebuttal and attacks, including a fierce and well funded campaign by the chemical industry to counter Carson's message. Within a year of its publication, Silent Spring had prompted programs for scientific research into the hazards of pesticides, brought significant changes in their regulation, spurred public debate on environmental practices more generally, inspired a younger generation of environmental activists, and made ecology a household word. Carson's initially embattled viewpoint on pesticide problems rapidly became absorbed into public sentiment. It is standard in the historiography of environmentalism to speak of the book as a perhaps the watershed of the modern environmental movement.

Why did these two works have such a different fate? What enabled Silent Spring's critique of pesticides to become so broadly accepted in middle-class America? Part of the answer lies, no doubt, in luck and in the New Yorker forum. Also contributing to the book's success were Carson's standing and skills as a gifted writer and her biological training, which Herber lacked. The latter two enabled her to offer a terrifyingly eloquent portrait of what it would mean to inhabit an increasingly toxic landscape. Building on post-war anxieties about technological excess and radioactivity, Carson's novel descriptions of the vulnerability of remote places and the most intimate of bodily processes to new chemicals that acted in eerie and unexpected ways was shocking and galvanizing.

In this essay, however, I want to consider how Silent Spring's success depended on its politics and, relatedly, its conception of nature. By not grappling head on with the political and economic factors that led to the entrenchment of pesticides in post-war America, and by centering its arguments instead on conceptions of natural balance and the web of life, the book was made palatable to a wide audience. I want to explore the mixed results of this success. The book's broad acceptance gave it considerable if circuitous political-economic

impact. At the same time, its avoidance of politics troubled the logic of Carson's text, and the prevalence of pesticide use was not related to structures of the American economy that remain with us today.

Herber's scarcely noticed book can scarcely serve as a model for a more politically desirable intervention, but it does highlight another conception of politics and nature that was possible, if not broadly acceptable, in that moment. Written pseudonymously by the journalist and anarchist theorist, Murray Bookchin, who later became well-known as the founder of social ecology, Our Synthetic Environment briskly covered almost all of the substance of Carson's critique of pesticides in less than twenty pages. The rest of his book documented the many other ways in which human health was compromised by the industrialized, urbanized way of life that increasingly characterized post-war America. Chemical hazards to human food supplies other than pesticides (synthetic hormones, antibiotics, and additives) were described in detail, as was the degradation and erosion of soil by large-scale agriculture, and the deterioration of the nutritional quality of crops raised on synthetic fertilizers. And beyond these problems of the food system, Bookchin described how health was endangered by a polluted, stressful, and dehumanizing urban environment; by the radioactive byproducts of nuclear testing and energy production; and by the rise in heart disease and cancer associated with lifestyle and environmental causes.

This range of assaults to human well-being and nature, claimed Bookchin, were of a piece, and originated in unviable social arrangements. They demanded a return to rural and agricultural communities of human scale through deindustrialization, decentralization, and a reining in of the profit motive, so that the "most pernicious laws of the market place" were not "given precedence over the most compelling laws of biology." Individual action or even remedial legislation were not, in his mind, sufficient to get at the heart of these problems; a sound ecological practice was synonymous, for Bookchin, with shaping a satisfying social life, considered in broad systemic terms. Bookchin's pill was clearly too big, bitter, and unfamiliar for most Americans to swallow at that time. His book was dismissed as "nice sentiments, only impossible,"<sup>1</sup> as "numbing" or "unmanageable" in its scope, and as offering only "incoherent," "intangible," or hopelessly utopian proposals.<sup>2</sup>

## CARSON'S NATURE

Whereas the focus of Bookchin's analysis was "the relationship between human and human," Silent Spring's center of gravity lay in Carson's reworking of deeply conventional conceptions of the balance of nature, and the web of life. When the President of the chemical manufacturing company, Monsanto, characterized her as "a fanatic defender of the cult of the balance of nature," he was reacting to what is indeed the book's central metaphor. Carson's nature "a "complex, precise, and highly integrated system" characterized by relations of "interdependence and mutual benefit," and regulating checks and balances" was the new science of ecology's rendition of a conception of the economy of nature that goes back to antiquity. In its explicitly theological 18th century form, for example, the harmony and order underlying nature's economy had a divine source; God's providence ensured a system of perpetual balance among all living things, in which each creature has its allotted place. The "balance of nature" provided Carson with a norm against which human interference could be assessed and challenged. The existing "system of relationships between living things," she claimed, "cannot be safely ignored any more than the law of gravity can be defied with impunity." A second guiding metaphor in the book is the related notion of an "ecological web of life" whose "threads" "bind" together organisms and their environment so that even minute changes in one area reverberate over space and time.

These notions "the balance of nature, the ecological web, "the natural" do a tremendous amount of persuasive work. Nature whole is the basis for Silent Spring's unsettling tidings of balance lost and of its critique of toxics. It allowed her to invert a tradition of nature writing that celebrated harmony and connectedness to cast pesticides as unnatural and sinister. Thus the book is dense with images of dislocation: a living world "shattered," landscapes "bludgeoned," threads "broken," fabric "ripped apart," delicate processes "uncoupled." Carson introduced a tone of elegy into conventions of wonder by introducing her reader to the unseen dynamics and relations of the natural world (a hidden sea of groundwater, invisible bird flyways and fish migration paths, teeming microscopic soil life) through portraying their disruption by pesticides. And by including the delicate internal realms of human and animal physiology

within nature's balanced and interconnected system, Carson seamlessly and chillingly joined inner and outer landscapes, ecology and human health, launching a new phase of environmental concern.

But while it provided Carson a versatile conceptual framework and familiar stirring images to underscore the fragility of natural systems and frame the hazards of pesticides, there are difficulties in founding a treatment of environmental destruction on a depoliticized notion of "nature." Terms like the "natural," or the "balance of nature" can obscure the social relations and priorities that go into evaluating environmental practices. Take, for example, Carson's preference for biological rather than chemical methods of pest control as less disturbing of the "nature's balance." This term reifies judgments about the respective benefits and costs to humans of these methods, creating internal contradictions in Carson's account. Why, for instance, is the importation of an exotic pathogen (a bacteria) to kill the Japanese beetle a "natural" means of control? Is this intervention which Carson notes in passing in another context, kills not only the target species but at least 40 other species in the scarabaeid family more respectful of the balance of nature than certain pesticides?

Similar questions could be asked about each of the biological control technologies Carson celebrates: juvenile hormones, chemical attractants, repellent sounds, microbial and viral infection of insects, introduced predators and parasites. For example, she enthusiastically endorses the dispersal of X-ray sterilized males and heralds the "complete extinction of the screw-worm in the Southeast" as a "brilliant success" and "a triumphant demonstration of the worth of scientific creativity." Slipping into the militaristic imagery and vision of total eradication she objects to in the mentality of the proponents of pesticide spraying, she talks approvingly of research that turned "insect sterilization into a weapon that would wipe out a major insect enemy." But surely the difference between this celebrated method and the chemical practices Carson castigates lies not in their inherent degrees of "naturalness" but in (human) judgments about their respective impacts. Had Carson chosen to cast the X-ray sterilization of males as unnatural, the rhetorical resources she uses to disparage pesticides could have easily been redirected, as in the following imagined rendition of the same facts Carson gives in her celebratory account.

Rather than seeking to understand the intricate life cycle and ecology of this tiny insect, scientists invented a scheme that would allow them, by infiltrating the very heart of their natural reproductive cycle, to sever the link between generations. Day after day, in huge fly factories, technicians bombarded male insects with mutagenic radiation and then, using 20 light planes working 5 to 6 hours daily, these insidious carriers of genetically altered material were dispersed over huge areas. Unsuspecting females mated with these seemingly normal products of the laboratory. While these unions produced eggs, these were, without exception, sterile. In less than two years, the species had vanished.

The ease with which a creative triumph becomes a tragedy of technological hubris highlights the instability of the categories of natural and unnatural.

Bookchin's analysis in Our Synthetic Environment, which didn't rest on notions of "the balance of nature" as a guide for interactions with the environment, is spared these particular paradoxes. As part of nature, humans are justified, claims Bookchin, in making the world's fate up as they go if they do so with an eye first and foremost toward "promoting human health and fitness." There is, he argues, no preordained state that must be preserved forever, and the "quasi-mystical" and unreserved valorization of "nature" and the "natural" is misguided, "an impediment to a rational outlook." For him human emotions in the presence of nature are not an indication of nature's special metaphysical status (as they were for the Transcendentalists with whom Carson sympathized), and reticence in using technology to remake nature in service of our needs should not be sentimentalized. "Our nostalgia," he claims, "springs from a growing need to restore the normal, balanced, and manageable rhythms of human life that is, an environment that meets our requirements as individuals and biological beings" (underlining mine). (Note that having foregone biological nature as a guide for human action, Bookchin immediately recovers another in human nature: the "normal" and the "balanced" rhythms of human life.)

## POLITICS, AND ITS AVOIDANCE

As Angus MacIntyre and others have shown, the massive adoption of synthetic pesticides in the postwar decades in America was facilitated by a densely interrelated network of factors. The dynamics of the competitive free market, in different ways, pressured farmers, suppliers of farm technology, and food processors toward pesticide use. In addition, pesticides were first tested and mass-produced during a period where priorities were skewed by wartime agendas, so that they were institutionally and culturally entrenched at the war's end. Existing standards and legal procedures were not fitted to enforce the regulation and testing of this new technology, nor to establish liability for damages it caused. And a pest-control method that was chemical-based, fast-acting, broad-spectrum, and seemed to offer total eradication, accorded well with certain American cultural values. In the face of these forces, the underfunded and mismanaged biological control methods that had shown great promise in the decades prior to the war did not stand a chance, and were soon eclipsed.

Silent Spring, however, made visible only a tiny part of this network of factors. This is because Carson cast the entrenchment of pesticides and the call for their replacement as primarily an epistemic and moral problematic, rather than a political-economic one. This, I believe, is a large part of what allowed her work to be so broadly accepted in that particular moment.

The book's muted political stance was in part a consequence of its author's background. Carson came to her book as a biologist, as an author immersed in the nature writing tradition since adolescence, and as a former writer and editor of public information publications for the Fish and Wildlife Service. (Bookchin was steeped in the writings of the Frankfurt school, in anarchist theory, and Marxism when he wrote his.) But an avoidance of overt politics was also a strategic choice, one of several Carson made in carefully shaping a defensible challenge of pesticide practices. Linda Lear in her forthcoming biography of Carson shows, for example, how Carson chose to include only a small amount of the extensive evidence she had for the environmental origins of cancer, and declined to mention organic gardening for fear of being associated with food faddists. Nor did Carson invoke the biocentric convictions about the inherent worth of other forms of life that she expressed in other writing. Similarly, while

it is clear from her remarks in interviews and from her collaboration with the politically outspoken director of the USDA Biological Survey, Clarence Cottam, that Carson was keenly aware of the financial incentives that skewed the development, use, and evaluation of pesticides, she kept this out of the book.

Carson had been warned of the hostility her pesticide work would invoke. She wrote and chose to moderate her claims in a period that some have called the "McCarthy era of the environmental movement," in which those who questioned the use of pesticides were specifically branded as being against the spirit of free enterprise. After the appearance of the New Yorker articles, for example, Louis A. McLean, Secretary and General Counsel of Velsicol, the sole manufacturer of chlordane and heptachlor, sent a five-page registered letter to Houghton Mifflin suggesting they might want to reconsider publishing Silent Spring. His letter built up to the following statement<sup>3</sup>:

Unfortunately, in addition to the sincere opinions by natural food faddists, Audubon groups and others, members of the chemical industry in this country and in Western Europe must deal with sinister influences whose attacks on the chemical industry have a dual purpose: (1) to create the false impression that all business is grasping and immoral, and (2) to reduce the use of agricultural chemicals in this country and in the countries of Western Europe, so that our supply of food will be reduced to east-curtain parity. Many innocent groups are financed and led into attacks on the chemical industry by these sinister parties.

In such a climate even some members of the Sierra Club's board of directors opposed the appearance of positive review of Silent Spring in the Club Bulletin.<sup>4</sup> A more forthrightly "political" analysis would probably not have survived to have Silent Spring's political impact. At the same time, however, Carson's avoidance of politics strained her book's logic and left unchallenged the structural underpinnings of pesticide use that are with us still.

One very concrete and necessary way in which politics was avoided in her text was through the circumlocutions she substituted for the names of chemicals, their manufacturers, or other delinquent parties in order to avoid law suits. With the single exception of the Army Chemical Corps, Carson did not name a single manufacturer of chemicals or pesticide brandname. For example, her extended

description of the biological havoc caused by pesticide wastes dumped over the course of ten years by a chemical plant: doesn't say which. Her discussion of a new carcinogenic chemical used against mites and ticks requires a stream of non-specific designations: "a chemical," "this chemical," "the chemical," "the product," "the suspected carcinogen," and so on, rather than Aramite, the products name. Even when protesting the fact that certain innocuously named weed killers sold for suburban lawns didn't list their ingredients, including chlordane and dieldrin, nor mention their dangers, she withheld the names of these products at this tantalizingly apt point, when mentioning them would have worked directly to end, not just describe, their facade of benignity. But even in the absence of potential legal action, claims Linda Lear, Carson might not have mentioned specific names; contention about specific culprits, Carson felt, would have distracted from her central message.

At a larger scale, Carson downplayed the political implications of her account through a consistently elliptical capping of its descriptions of irrational pesticide use. Repeatedly she builds a careful case for why the instances of spraying she describes were not only harmful to humans and wildlife, but unjustified even in terms of biological effectiveness or economic payoff to farmers. Why did spraying take place nonetheless? Carson's scenarios demand an answer, but hers is vague or often lacking altogether. The reader is left to make their own inferences or, more likely, to ignore the troubling questions these narrative lapses signal. This kind of hanging question seems to be most comfortably accommodated at the end of sections. "The science of range-management," she says in the last sentence of chapter six, "has largely ignored [the] possibility [of biological control of weeds by plant-eating insects] although these insects ... could easily be turned to man's advantage." She concludes another section with the observation that "there is no dearth of men who understand these things ... but they are not the men who order the wholesale drenching of the landscape with chemicals." Elsewhere she describes how "funds for chemical control came in never-ending streams, while the biologists ... who attempted to measure the damage to wildlife had to operate on a financial shoestring." Why the marginalization of effective biological control? the distance between those who know and those who order? the discrepancy between budgets for inventing chemicals and for studying their damage? Carson's silence

on these questions buries the problem of the democratic control of science, technology, and production.

To the extent that Carson does trace the origins of the destruction whose "irrationality" she has exposed, her account of agency is feeble and diffuse, her blame mild. Destruction of the environment stems from people's failure to "read" the "open book" of the landscape; facts about pesticides' destructiveness are denied out of "shortsightedness;" spraying continues because of "entrenched custom," or "surely, only because the facts are not known."<sup>5</sup> We are walking in nature like an elephant in the china cabinet, she quotes a scientist whose rare understanding she respects, implying "our" problem to be one of clumsiness.

Even at the level of single sentences Carson frequently masked agency and blame through passive or negative sentence constructions at critical points. She tells, for example, of farmers who chose to spray crows rather than switching to a variety of corn that didn't attract birds because they had been persuaded of the merits of killing by poison" (underlining mine). Her excision of the subject here closes down a crucial line of inquiry. A similar negative formulation lessens blame even as it assigns it. "Because the spray planes were paid by the gallon rather than by the acre," Carson says, "there was no effort to be conservative." How much more powerful would this sentence have been had its latter part been directly and positively phrased: "there was incentive to use as much as possible?" (It would also have helped had she unreified "spray planes" to make more visible which people were paid.)

Carson's reticence in talking about the political and economic forces encouraging heedless pesticide use disabled her capacity to talk about fundamental social interventions as part of a solution. Her proposals, therefore, gravitate toward the only resource left to her: a respect for the balance of nature and ecological interconnectedness. This is to be achieved through attitudinal reform and the technologies of biological control. Her call for new attitudes consists of a reasonable even inspiring repudiation of human arrogance in favor of an attitude of cautious "guidance," reasonable "accommodation," sensitive "management," and an ethic of "sharing" rather than "brute force." These are valuable orientations in themselves, but their mildness and abstraction bespeak the book's missing politics.

Carson offers the biological control of pests as the technical manifestation of this more humble attitude. One could not hope for a more symbolically-appealing solution: Yankee ingenuity in service of a pastoral ideal. By pastoral here I am referring to what Leo Marx points to as the most long-lived Western model for an appropriate relation to nature, which proposes a middle ground between the wild and the over-civilized. Silent Spring opens with such a middle ground in its rustic idyll of "a town in the heart of America where all life seemed to live in harmony with its surroundings." This prosperous town is far from the trouble of cities, but also safely removed from wild nature, signified by the barking of foxes in the distant hills. Pesticides are an evil blight disrupting this harmony, killing the town's birds and animals and bringing a strange stillness, a silent spring. At the other side of the book, in the last chapter, entitled "The Other Road," Carson offers her proposal for regaining this lost balance through various forms of biological pest control. It too is structured as a middle ground, a way of navigating between the technological hubris of pesticides on the one hand, and a vulnerability to nature's wildness in the form of pests on the other. It embodies the pastoral vision of enjoying the best of human artifice and inventiveness while preserving a closeness to natural cycles and creatures.

Carson's focus on achieving a proper relationship to "nature," however, tends to displace an analysis of structural forces that encourage their use. Thus the adoption of alternative methods of pest control is repeatedly posed as a problem of knowledge and attitude, not politics. "Nature herself," she says,

has met many of the problems that now beset us, and she has usually solved them in her own successful way. Where man has been intelligent enough to observe and to emulate Nature he, too is often rewarded with success (80).

Yet Carson had evidence suggesting that humility and biological knowledge alone often did not determine the choice of pest control methods. She herself describes the repeated bypassing of forms of biological control known to be cheap, effective, and harmless in favor of harmful chemicals. And she knew that for decades prior to World War Two, before they were eclipsed by faster-acting and profit-producing insecticides, biological methods had been investigated and adopted not because they offered a more "natural" or ethical

superior solution but because they were cheap and effective. Nor were the many problems that plagued chemical pesticides (resistance, resurgence, toxicity, bioaccumulation) a surprise that surfaced with their widespread agricultural use in the post-war years; most were recognized decades before Silent Spring was published.

Carson mentions some of these early successes as well as several contemporary "shining models" of non-chemical methods of pest control in her chapter on biological control. And in her next chapter, which is on the problems of chemical control, she describes prominent early disasters of chemical control, and the intensification of pesticide side-effects in the late fifties. Once again, she has juxtaposed facts that pose a pointed question: why has a problematic form of pest control replaced an effective one? Here she offers the book's sole explicitly structural analysis, but this gets lost in the book as a whole. This analysis consists of the the two paragraphs about chemical industry funding for university research mentioned earlier, whose impact is soon diluted with more idealist explanations. The chapter continues to talk of people being "slow to recognize" problems with pesticides, and of chemical research drawing the best people because it seems "more exciting," and Carson concludes it with a quotation that exemplifies the book's dominant message.

We need a more high-minded orientation and a deeper insight, which I miss in many researchers. Life is a miracle beyond our comprehensions, and we should reverence it...The resort to weapons such as insecticides to control it is a proof of insufficient knowledge....Humbleness is in order; there is no excuse for scientific conceit here (243).

Bookchin makes a different use of the past in his somewhat broader and more forthright account of how vested interests have shaped the directions taken by modern agriculture. He discusses, for example, how the food industry undermined enlightened standards for food purity in place at the beginning of the century, and nibbled away at the Delany clause protecting consumers from carcinogens. For Bookchin, these early achievements are not simply past models for what could be achieved again in the future, but roadblocks in the way of any simple narrative of progressive discovery; his description of the eclipse of sane

ways of doing things points his readers more consistently to the political struggle necessary to establish and uphold these.

## **PUSHING THE LIMITS**

Silent Spring presented facts that brought its readers to the threshold of difficult questions about how pest control might be guided by biological knowledge and democratically determined priorities, rather than the logic of capital accumulation. But Carson's avoidance of politics, abetted by her conceptions of nature, helped lead them away again. Through these she initiated her readers to see pesticide problems as due to oversight and carelessness, or at the most arrogance, rather than to greed or systemic structural factors. By casting the problem of pest control as primarily an issue of achieving a harmonious relationship to "nature," with little reference to the social criteria embedded in the term, nor the changes in social institutions necessary to achieve this harmony, Carson stripped her book of overtly political analysis or claims. She seemed to believe that it was enough to present the facts and let public opinion take over.

My goal, however, is not to judge the book politically ineffective or undesirable, only to highlight the limits of what could be said and widely heard in that particular moment. The disappearance of Bookchin's work and the furor over even the politically restrained Silent Spring suggest that Carson stood close to these limits. A broadly understandable and persuasive challenge to the pesticide paradigm had to both criticize and placate, extend and maintain existing worldviews. Carson's book did not call for nor achieve a fundamental democratization of research, technology and production. But it did frighten people, linked health to nature for the first time as a topic of heated public debate, and drew on familiar conceptions of nature to undermine the postwar aura of pesticides as a marvelous technical achievement and cast them as sinister and stupid instead.

The book's political consequences are complex, and still unfolding. It prompted a debate that led to legislation banning some pesticides and tightening the procedures for testing, registering, and using others. But with political-economic groundrules remaining intact, agriculture and the chemical industry

could respond to these developments relatively easily. Restrictions placed several years later on organochlorines, the earliest generation of synthetic pesticides such as DDT, for example, didn't halt their continued manufacture for export, nor the development and profitable production of other pesticides, nor recent attempts to genetically engineer profitable and hazardous pest and pesticide resistant crops. More generally, these reforms did nothing to stop the trend toward increasingly mechanized and large-scale agriculture that made pesticides unavoidable. On the thirtieth anniversary of Silent Spring's publication the Executive Director of the National Coalition Against the Misuse of Pesticides could still describe America as standing at the crossroads between "promoting safer alternative pest management techniques or simply substituting less toxic inputs into conventional pesticide-intensive practices," and report on "the extremely limited support for alternative [pest control] practices from most mainstream agricultural institutions."<sup>6</sup>

At the same time, however, other longer-term and more subtle effects of the sea-change Carson helped initiate are only now beginning to surface. For example, the cost of approving a new pesticide and the demand for organically grown produce have both grown to a point where alternative forms of pest management are now becoming economically feasible. Curiously, it may have required an "apolitical" challenge to pesticides to initiate this process.

## NOTES

- <sup>1</sup> John Osmundsen in the New York Times Book Review, May 19, 1963, p. 28.
- <sup>2</sup> Quotations from Osmundsen and from a review in the Times (London) Literary Supplement, February 15, 1963, p. 103.
- <sup>3</sup> Frank Graham Jr., Since Silent Spring. Boston: Houghton Mifflin, 1970, p. 49.
- <sup>4</sup> Robert Gottlieb, Forcing the Spring: The Transformation of the American Environmental Movement. Washington, DC: Island Press, 1993, pp. 85-6.
- <sup>5</sup> Could this "surely" be Carson allowing herself a touch of irony?
- <sup>6</sup> Jay Feldman, Thirty Years after *Silent Spring*, the Choice is Clear.; Global Pesticide Campaigner 2(4) (1992): 11-12.