



Drawing by
Lois and Louis Darling
from *Silent Spring*

THE MOST IMPORTANT chronicle of this century for the human race," says Justice William O. Douglas of Dr. Rachel Carson's recently published *Silent Spring*. The noisy reaction to it gives indication that no book since Harriet Beecher Stowe's *Uncle Tom's Cabin* has so stirred the American public and Washington officialdom as has this beautifully written and well documented appraisal of the pesticide problem. Shortly after publication the book became a best seller and a Book of the Month Club selection. Few books have induced such controversy and such a plethora of written and verbal comments, praise, and condemnation, or brought forth such a tidal wave of letters to congressmen, government agencies, newspapers, and to the author and publishers. More than 95 per cent of the avalanche of mail concerning her book has been complimentary. This modest, quiet, but brilliant, writer and scientist has been catapulted into the public consciousness.

It is not surprising that the most extreme reactions against this skillfully and effectively written document have come from those whose purse strings and employment are threatened. There is much evidence to support the published rumor that segments of the pesticide chemical industry have raised large sums to hire a public relations firm to help counteract and destroy the effects *Silent Spring* is having upon U.S. citizens. Violent reactions have emanated from many segments of the chemical industry, already a little "skittish" from criticisms about the adverse effects of a goodly number of pesticide products. Likewise, criticism has at times been extreme from officials of bureaucracies and other public and private agencies engaged in control operations. Some authorities in the field of economic entomology, particularly those who receive financial support from industry directly, or for their laboratories, have been violent in their opposition to the book. Others who have directed and widely supported some of the unrestrained chemical control or eradication programs have been among the most extreme in their condemnation of the message this book so vividly and convincingly portrays.

A Noisy Reaction

Extremists have been found on both sides of this prevailing issue. Some wildlife enthusiasts, nature lovers, sentimentalists, and those whose economic and recreational interests have been adversely affected by these dangerous poisons, along with an ever increasing number of people who have been made ill by exposure to various chemicals, have been equally as extreme in condemning almost all use of pesticides.

In the vigorous campaign against *Silent Spring*, the philosophy seems to exist that it makes little difference what line of attack is followed if only the book is condemned. A writer for the *Globe Times* of Bethlehem, Pennsylvania, in describing the adverse reactions of farm bureau members from two Pennsylvania counties to this best seller, wrote, "No one in either county farm office who was talked to today had read the book, but all disapproved of it heartily." A still more common situation throughout America, following what appears to be a planned program of attack on this book, was summarized by the editor of the *Bennington Banner*, when he wrote that "the anguished reaction to *Silent Spring* has been to refute statements that were never made."

Knock the Straw Man Down

Another obvious approach in opposing a philosophy or weakening a cause is to discredit the author or the persons who champion it. In the effort to discredit those crying for a saner approach in the use of pesticides, the masters of invectives and insinuations have been busy. Miss Carson has been referred to slightly as a priestess of nature, a bird, cat, or fish lover, and a devotee of some mystical cult having to do with the laws of the Universe to which critics obviously consider themselves immune. These same critics have referred to her as a pseudoscientist and faddist.

A common approach of extremists or unscrupulous critics is to build straw men and then proceed to knock them down. One writer condemns Miss Carson's "emotional and inaccurate outburst" and then proceeds to proclaim the merits of pesticides without restraint and in terms no responsible scientist can accept.

A number of agricultural chemical leaders have condemned the author for being emotional and one-sided in not showing the great values of pesticides and related chemicals. To look at this criticism objectively I would ask, why should she have

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By Clarence Cottam

to *Silent Spring*

emphasized the values of pesticides? Hasn't this side of the problem already been overemphasized by a multi-billion dollar industry employing many of the most experienced salesmen and lobbyists available? The author clearly states that her purpose in writing the book was to show the actual and potential dangers involved in our reckless and largely unrestrained broadcasting of some of the most deadly poisons yet concocted by man. Her goal has been admirably achieved and with an array of verifiable facts that few unbiased scholars will question. Admittedly, her subject dealt with the dangers of pesticides and not their values. The chemical industry is at liberty to write a volume explaining this if it feels it has not already adequately informed the American public.

In his intemperate condemnation of *Silent Spring*, F. A. Soraci, Director of the New Jersey Department of Agriculture, refers to those who oppose "large scale pest control programs" as "a vociferous, misinformed group of nature-balancing, organic-gardening, bird-loving, unreasonable citizenry." This would seem to imply that all pest control, at least in New Jersey, is wholly in the public interest and so nearly perfect that improvement in formulation, timing, or methods of application would not be possible. Such extreme of unfairness and absurdity will do the cause of legitimate control much more harm than good. We doubt that even many of those who oppose *Silent Spring* would concur with such an irritable and irresponsible statement—and especially coming from a prominent state official! The Soraci comment stands out in striking contrast to the temperate, dignified, and documented discussion by Miss Carson in her account of large-scale control or eradication programs.

Dr. William J. Darby, a well-recognized biochemist and nutritionist of Vanderbilt University, despite his eminence as a scientist, appears not to be above bias and prejudice when some of his own views and interests, or those of his department, are involved. He has been so uncharitable and intolerant as to imply in his review of *Silent Spring* in *Chemical and Engineering News* of October 1, 1962, that Miss Carson's book is "completely without any semblance of scientific objectivity." He further writes, "Her ignorance or bias on some of the considerations throws doubt on her competence to judge policy. For example, she indicates that it is neither wise nor responsible to use pesticides in the control of insect-borne diseases." This is not her position as her book clearly shows. Such a statement from a man of Darby's scientific training indicates an inexcusable degree of bias that causes one to wonder *why*?

Earlier in the same review, Darby's irritation or personal interest causes him to severely criticize Miss Carson's 55 pages of references. He indicates that these will appeal only to those "as uncritical as the author," such as "the organic gardeners,

the anti-fluoride leaguers, the worshippers of natural foods, those who cling to the philosophy of a vital principle, and pseudo-scientists and faddists." We can be sure Dr. Darby would have exploded had the author not well documented her facts which he obviously does not want to accept.

Dr. Darby concludes that "... In view of her scientific qualifications in contrast to those of our distinguished scientific leaders and statesmen, this book should be ignored."

Because a few other extreme critics have attempted to belittle Dr. Carson's background, training, and competence, a few comments on this subject are called for. The record, including *Who's Who* and *American Men of Science*, which these uncharitable critics should have at their command, shows clearly that the author is highly acclaimed. Few of her critics can approach her in the number of degrees, awards, and honors she has received for outstanding accomplishments. Dr. Carson has received four honorary doctorates from well-recognized universities, one in biology and three in letters or literature. She has been the recipient of more than 15 national honors, including: Fellow of the Royal Society of Literature; National Institute of Arts and Letters; Membership in the Woods Hole Oceanographic Institute; Gold Medal Award of the New York Zoological Society, Silver Jubilee; Achievement Award American Association of University Women; Westinghouse American Association for the Advancement of Science Writing Award; and the U.S. Department of Interior Distinguished Service Award.

Her book, *The Sea Around Us*, which sold well over two million copies plus many thousands of paper-covered volumes, was a Book of the Month Club selection and a best seller for 86 continuous weeks. This book has been translated into more than 30 languages. The clarity and attractiveness of her writing showing the complex interrelationship of the life of the sea reveal her superior competence as a biologist and ecologist as well as a writer of extraordinary skill. Those who attempt to belittle her are more effective in belittling themselves.

Dr. Carson's message in *Silent Spring*, as in her three preced-

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Noisy Reaction to *Silent Spring*

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ing books, is predominantly ecological. Much of the honest criticism in her latest contribution stems from the fact that her critics do not understand her purpose or they know too little of the broad aspects of ecology to grasp her message, despite the fact they may be eminent biochemists, nutritionists, entomologists, or specialists in some related or specialized field. The fact that *Silent Spring* already is being translated into a number of foreign languages, and that its sales are skyrocketing, shows that it has world-wide appeal to the thinking public.

A Philosophy of Control

Anyone who has objectively read *Silent Spring* is well aware that Dr. Carson does not oppose control of pests and neither does she advocate complete abandonment of chemical controls. In her book, she has effectively criticized the present methods not because they control undesirable pests, but because they control them poorly and inefficiently, because these methods cause unnecessary damage to other interests and resources, and also because of their potential harm to man. Most of the national pest control effort during the past decade has been directed toward chemical control, and in this period efficiency of control has decreased alarmingly.

Until the last few years, the Department of Agriculture and economic entomologists generally have estimated crop loss from insect depredations at about 10 per cent. It is startling to find that as the amount of poisonous toxicants increased, the per cent of crop loss continued to increase until now one-quarter of our annual production is destroyed by insects! Isn't it an interest contrast, that by sterilization of the male of the species, the dreaded and destructive screw worm fly was completely eliminated from the southeastern states. And no chemical pesticides were used.

To illustrate that an objective look into our all-out chemical approach is necessary, it can be reported that approximately 150 of our most obnoxious pests have developed a considerable degree of immunity or resistance to one or more groups of pesticides. Effective control of these destructive pests, therefore, must be achieved by some other means. Entomologists assure us that this trend toward immunity is increasing at an accelerating rate.

Other reasons that suggest the need of a fresh and objective look at the control programs include the actual and potential contamination of soil, air, and surface and underground water. The contamination of our foods with poisonous residues, the effects of which we know relatively little, is also of major importance.

With few exceptions, conservationists and naturalists would agree that control against pests in this modern age, wisely directed, is a necessity. Chemical pesticides were developed in response to a public need and demand, and they are here to stay. This does not mean, however, that our present dangerously toxic, stable, broad spectrum formulations are with us as permanent control agents. In fact, we hopefully look forward to the time in the not too distant future when they will be

replaced by more specific, less dangerous pesticides, and when they will be used more wisely. We feel that the facts are crystal clear that chemical pesticides have been used altogether too widely, too indiscriminately, and without much consideration of other values. Overemphasis has been placed on chemical control and too little support and concern shown the biological and cultural approach. A more basic ecological concept has long been needed.

Answers from Respectful Cooperation

I am in full agreement with Richard L. Kenyon's timely suggestion, as expressed in *Chemical Engineering News* of July 23, 1962, that the answers to the conflicts and problems between conservation forces and those using chemical pesticides are more likely to come from respectful coöperation among scientists than from emotionally choosing sides and calling names.

Dr. Carson's philosophy of pest control is succinctly expressed near the close of Chapter 2 of her book, and it is also accurately recorded in *Chemical Engineering News* of August 13, 1962, wherein she states, "My contention is not that moderate chemical controls should never be used . . . but, rather, that we must reduce their use to a minimum and must as rapidly as possible develop and strengthen biological controls. I contend that we have put poisons and biologically potent chemicals indiscriminately into the hands of persons who are largely or wholly ignorant of the harm they can do. There is still a very limited awareness of the nature of the threat. This is an area of specialists, each of whom sees his own problems and is unaware of, or indifferent to, the larger frame into which it fits. It is also an era dominated by industry, in which the right to make money, at whatever cost to others, is seldom challenged."

In the same issue of *Chemical Engineering News*, under the headline "Industry Maps Defense to Pesticide Criticisms," Dr. George C. Decker, economic entomologist of the Illinois National History Survey, former adviser and collaborator on insect control to the U.S. Department of Agriculture, and paid consultant to pesticide companies, says in his derogatory review of *Silent Spring* that it "poses leading questions, on which neither the author nor the average reader is qualified to make decisions. I regard it as science fiction, to be read in the same way that the TV program 'Twilight Zone' is to be watched."

How times do change! In March 1950, before the Fifth Annual Meeting, North Central States Branch of Economic Entomologists, Dr. Decker, as a senior leader in the field, cautioned his fellow entomologists as follows:

"Chemical control of insects is only one phase of insect control, yet it appears that the urgent demand for information on new insecticides has led all of us [control operators and researchers] into a large scale faddistic swing to insecticidal investigation at the expense of our other research . . . I believe . . . that man, as a rational and intelligent being, should be able to outwit insects and not rely entirely upon chemical warfare . . . Insecticides are fire-fighting, not prophylactic weapons . . . (They are) habit forming in that once their use is started their continued use becomes more and more necessary . . ."

"... annual losses due to insects remained at about 10 per cent from 1889 to 1941, despite the fact that expenditures for insect control increased from \$75,000 to over \$15,000,000 during that period.

Now we have added ten more years and still no change. It seems quite obvious to me that we should not and cannot consider the use of chemicals a substitute for sound cultural and other biological control methods.

"We have been amply warned that many of the new insecticides can and often do upset the biological balance in an area, and while promoting more effective control of one pest, we produce an equally or even more destructive outbreak of some other lesser pest.

"... When properly used (insecticides) are very valuable tools, but like the A-bomb, if unwisely and wrongly used, they may lead us to our doom.

"It seems to me we are in the position of the drunk in a high-powered car approaching a stop-and-go light. We had better sober up, stop, look, and listen for danger signs before we proceed much further."

Dr. Decker's timely philosophy at that time, presented objectively and without bias at his own insistence, is a succinct summary of much of the philosophy in Dr. Carson's *Silent Spring*. It was and still is a timely and much needed statement of truth and not fiction, as is that same message in *Silent Spring* which he now sees fit to castigate. What induced this abrupt reversal of viewpoint?

As chairman of the Pest Control and Wildlife Relationships Part I Subcommittee on *Evaluation of Pesticide-Wildlife Problems* (National Academy of Sciences-National Research Council Publication 920-A), Dr. Decker points out that currently "estimates of crop destruction caused by agricultural pests range from 8 to 15 billion dollars annually—a quarter of our annual production—and this occurs despite the widespread use of control practices now available."

In man's battle against arthropod and other pests that destroy his food and fiber, he should adopt any and every means at his command to win the race. As with an army, trouble is inevitable when the leadership applies only one means of defense and attack. This is precisely what has been wrong with our pest control program during the past decade. Perhaps under pressure of the chemical pesticide industry and its paid supporters, we have found ourselves in trouble because we have been relying almost exclusively on the chemical approach. To make bad matters worse, as illustrated by the fire ant eradication program, operational control had long been under way before much of the essential research was conducted. When we rely almost solely on the chemical approach, this induces immunity which necessitates larger and larger doses and then the production of more and more poisonous, broad spectrum, stable pesticides.

The relatively few serious attempts at other approaches have given much encouragement that in time we may expect more efficient, effective, and economical control, where all methods are appropriately considered. In this, we do not exclude the wise and restrained use of needed chemicals. But there is much evidence—witness the Southeast screw worm sterilization program—to suggest that biological control provides a much safer, more effective, and more economical means of insect elimination. Among other biological controls, we could mention plant and animal breeding to develop resistant strains, the application of improved cultural and management methods, and appropriate use of fertilizers.

In Dr. Decker's "Pros and Cons of Pests, Pest Control, and Pesticides," reprinted from *World Review of Pest Control*, Spring 1962, Vol. 1, Pt. 1, he glibly writes: "If we were to adopt a policy of 'let Nature take its course,' as some individuals thoughtlessly advocate, it is possible that these would-be experts would find disposing of the 200 million surplus human beings even more perplexing than the disposition of America's current corn, cotton, and wheat surpluses." This argument is another straw man. No responsible naturalist, biologist, or conservationist has advocated such a policy in agricultural management. Neither does *Silent Spring*.

It would indeed be surprising in a complex study involving so many unknowns, and where essential research has been subordinated to operational chemical control, if a few errors, minor misstatements, and wrong conclusions on details did not show up in a book written explicitly about this problem. This fact is of minor importance as it relates to *Silent Spring*. The author's basic conclusions are sound—namely that America is poisoning its environment, its soil, water, air, and plant and animal life and that we have everything to gain and nothing to lose by being prudent and conservative in the use of our highly toxic chemicals. Certainly we are using deadly poisons without safe knowledge of their potential "side" or long-term effects.

Dr. Lewis Herber in his new book, *Our Synthetic Environment*, points out that defective offspring, decreased resistance to infection, and degenerative diseases such as cancer, heart disease, and diabetes may arise from subtle changes in food composition and quality. Certainly a stepped-up program on the side or indirect effects of pesticides is imperative. We are subjecting whole populations to exposure to chemicals which animal experiments have proved to be extremely poisonous and in many cases cumulative in their effect. Some are known carcinogens. No one knows what the results might be because we have little past experience to guide us. The thalidomide tragedy should have shocked us into full awareness of the hazard. Grain treated with a fungicide, hexachlorobenzene, shipped to Turkey and intended as planting stock, was consumed by hungry people, and already more than 5000 deformed and ill victims have been reported.

As recently as October 27, 1962, the Food and Drug Administration proposed that all chemically treated food grain seed be brightly colored so as to be easily distinguishable from untreated seeds or grain intended as food for people or livestock. They felt this seemed to be necessary because seed grain (usually treated with poisonous fungicides) left over at the end of the season was finding its way into food channels.

The noisy controversy over *Silent Spring* is bringing into focus issues of transcendent importance. Are we encountering a spirit of Lysenkoism in America today, similar to the totalitarian philosophy that perverted and largely destroyed the science of genetics in Russia and infiltrated much of that nation's agricultural sciences? If so, we are facing a sinister problem. Specifically, is there a brazen but subtle effort being made to protect the pesticide industry and serve the gods of profit and production regardless of truth? Science ceases to be science when it loses objectivity and disregards truth.