

THE SILENT DECADE:

WHY IT TOOK TEN YEARS TO BAN DDT IN THE UNITED STATES

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*"It is our alarming misfortune that so primitive a science has armed itself with the most modern and terrible weapons, and that in turning them against the insects it has also turned them against the earth."*¹ – Rachel Carson

A true catalyst in the grassroots environmental movement in the United States, Rachel Carson, American marine biologist and writer, worked tirelessly to reveal the many side effects of the use of pesticides. Her book *Silent Spring*, published in 1962, was arguably the first significant step towards the US ban of the insecticide dichloro-diphenyl-trichloroethane (DDT) in 1972. The "primitive science" that Carson mentions is the desire to eradicate flying insects, a desire which has "armed itself" with the technology that created DDT. With this new weapon, or technology, the goal of protecting humans from disease was met with the recognition of possible side effects upon those the chemical sought to protect. Carson's research helped bring this issue to a greater audience outside of traditional scientific circles via a literary medium. Despite the impact created in the wake of Carson's book and her desire to inform the public, there is one lingering question: In light of the large impact that Carson's book had in 1962, why wasn't DDT banned in the United States until 1972? This article will argue that the ten-year delay in the ban of DDT following the publication

of *Silent Spring* was a result of the insecticide's effectiveness in fighting malaria, public ignorance over the side effects of DDT until scientific research revealed ill effects on wildlife, and the lack of a federal regulating body to ban DDT until the creation of the US Environmental Protection Agency in 1970.

The decision to ban DDT is no stranger to previous historical analysis. Environmental historian Thomas Dunlap, for one, has analyzed the complex relationship between science, politics and public policy, and citizens in the United States. More specifically, Dunlap has researched the rise of environmentalism in response to Rachel Carson's book and the scientific issues raised over DDT by compiling previous secondary sources, such as those that explored the chemical's effects on fish and wildlife.² Dunlap also discusses the role that DDT has played with regard to the scientific community and public policy in the United States, touching on issues surrounding DDT's effects on wildlife as well as the political and public perception of *Silent Spring*.³ Two other scholars who have studied the relationship between DDT and malaria, a disease that DDT was primarily used against, are Richard Tren and Roger Bate. Their research primarily addresses the global eradication campaign against malaria during and following World War II.⁴ Other scholars who have devoted their research to the political decision to ban DDT are Christopher J. Bosso and Charles F. Wurster, who describes the history of DDT before *Silent Spring* and federal litigation after its publication.⁵ These scholars represent but a few of those that have dedicated research to multidisciplinary issues surrounding the history of DDT.

These scholars' research is invaluable to my own work. However, this article will approach the research question using not only previous work conducted by various individuals, such as Dunlap and Wurster, but also information provided by such entities as the US

Environmental Protection Agency (EPA) and the Pan American Sanitary Bureau. In addition, this paper will answer the research question by including political documents and research pertaining to *Silent Spring* itself and the reasons behind the use of DDT to eradicate malaria around the world. For example, the official report by the EPA on the decision to ban DDT offers new insight into the specific role that politics played in the battle over whether to ban DDT in the United States. This paper will also incorporate the personal collection of Daniel E. Wright, who worked for the United Nations Public Health Service during World War II and pioneered using DDT to control malaria in Greece. In this fashion, this paper is not only in agreement with the arguments put forth by many of these authors, but will also bring new primary sources into the discussion to help build on previous research. Additionally, this paper will compile three different primary reasons that contributed to the delay in the ban that may not have been put together in the past: DDT's success in combating malaria, emerging scientific evidence of side effects on wildlife, and the creation of the EPA.

HISTORICAL BACKGROUND

In order to completely understand the issues associated with DDT, one must know how the chemical operates once applied to an organism. In short, DDT attacks the nervous system via the obstruction of natural nerve impulses, which can cause symptoms such as loss of coordination, convulsions, and vomiting in both animals and humans.⁶ However, before scientific research was released during the 1960s and the publication of *Silent Spring*, no one could have understood the full extent to which DDT affected the entire natural environment, including human life. This ignorance persisted until Rachel Carson helped bring these issues into the public eye.

Rachel Carson, born in rural Springdale, Pennsylvania, was an avid lover of nature and possessed a strong sense of duty to protect the natural environment. Upon graduating from Johns Hopkins University in 1928, she joined the U.S. Fish and Wildlife Service as a marine biologist and went on to write about environmental issues associated with aquatic life. In 1958, Carson received a letter from a colleague in Massachusetts who expressed concern over the massive bird kills at Cape Cod due to the spraying of DDT. Since the end of World War II, DDT had been used to control diseases, like malaria, at alarming rates, and this episode proved to be what ultimately drove Carson to write *Silent Spring*. After four years Carson finished the book, which focused mainly on how DDT enters the fatty tissues of animals and humans via bioaccumulation in the food chain, causing cancer and genetic birth defects. Her main argument stated that DDT's long-lasting presence in the natural environment irreversibly affected the health of animals, birds (thinning of egg shells), and mammals while also permanently poisoning the world food supply.⁷ This chemical persistence would in turn create a "silent spring," where no birds sang. Rachel Carson's mission to uncover DDT's detrimental effects was a significant stepping-stone in the eventual decision by the US government to ban the insecticide. However, the fact that DDT was not officially banned in the United States until a decade after publication shows that many still were unconvinced and considered the chemical a valuable as well as significant weapon in the fight against malaria and other insect-borne diseases.

DDT is an insecticide that had not been widely used by the United States as a form of insect control until World War II. More specifically, it is an organochlorine pesticide that was created in Germany in 1874 and was initially used by the US military to help control infectious diseases, such as malaria and typhus, during World War II. The United

States fought the war on two fronts, one being in tropical areas of the Pacific Ocean.

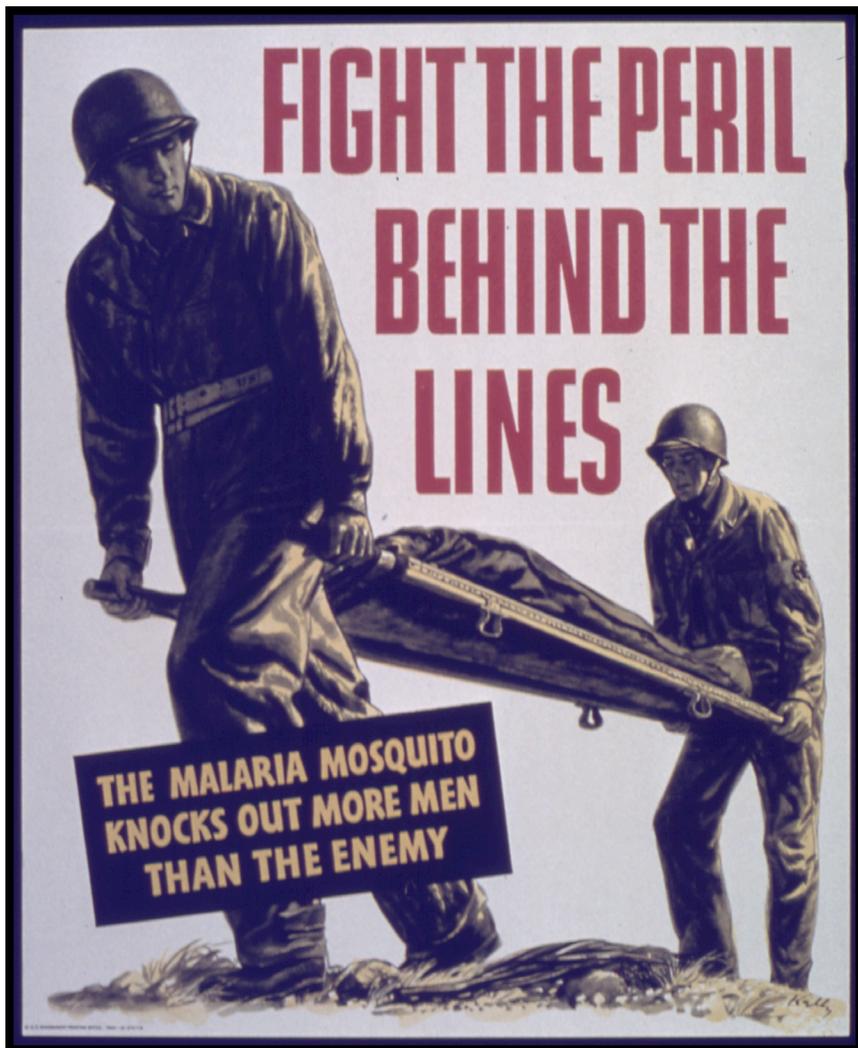


Figure 1: Public Health Poster from World War II, NARA

DDT was no stranger to propaganda; for every one man killed in battle, malaria would kill eight, which gave the United States a stepping-stone from which to push its DDT agenda during the war. DDT was used largely due to

its reasonable cost, demonstrated effectiveness, and persistence in killing insects.⁸ DDT was also used on the commercial and residential levels, by farmers on their crops, and in office buildings to control insect populations. The insecticide also proved to be relatively inexpensive to manufacture and stayed in the environment for a long time, effectively killing any insects that came within a certain range.

Between 1946 and 1950, cases of malaria fell from approximately 400,000 to practically none because of the use of DDT. DDT is still used today in parts of South America, Asia, and Africa with the aim of controlling malaria in places that may not be able to afford more expensive and potentially safer alternatives.⁹ As one can see, the early stages of DDT's development showed much promise and cost-effectiveness when dealing with global diseases. Because of the ban on DDT in the United States in 1972, restrictions have been applied to its use; DDT can legally be produced in the United States but may only be sold to or used by foreign countries. Two of the major reasons behind the ban of DDT were the scientific evidence that exhibited buildup in the fatty tissues of wildlife while persisting in the natural environment and proved the existence of an evolutionary resistance that insects began to develop towards the chemical.¹⁰

DDT AND MALARIA

Malaria is a mosquito-borne disease that can be found primarily in tropical and impoverished areas of the Earth. It can cause fevers, headaches, and may even lead to death. To understand malaria's importance in the delay of the DDT ban, one must refer to different case studies of its effectiveness in controlling the disease around the world. In 1954, the XIV Pan American Sanitary Conference ordered the Pan American Sanitary Bureau to take

immediate measures to eradicate malaria within the Americas. Malaria had been one of Mexico's biggest health problems, with the infected area covering about 772,000 square miles.¹¹ Following the order to eradicate malaria in the Americas, the Mexican government directed its attention to nation-wide control of the disease, completing the plan in 1955. In 1956, the first stages of spraying were carried out upon nearly 500,000 houses, with the goal of reaching nearly three million households by 1957. DDT was used to spray about 15% of the houses and was carried out by the Department of Epidemiology in Mexico.¹²

In South America, malaria was the leading health problem in Ecuador, with about half of the population infected by the disease. Malaria contributed to the three leading causes of infant mortality in Venezuela, which became the first country to begin a national DDT program in 1945. Eradication of malaria in Venezuela was reported to have covered 117,525 square miles within a population of 2.5 million citizens.¹³ Malaria had also once been considered one of the major causes of health problems in Cuba in the 1950s. After Cuba partnered with the Rockefeller Foundation in using DDT to spray the houses, malaria was no longer a major health problem in some of its rural provinces.¹⁴ The need for world-wide control of malaria is also supported by Paul F. Russell of the Rockefeller Foundation. In his publication, "World-Wide Malaria Distribution, Prevalence, and Control," he emphasizes the need to use stronger doses of anti-malaria therapy and concludes that malaria control must be conducted on a higher level, despite the need for more research of the side effects of DDT. In 1956, Russell wrote that there had been a focused attack on the disease within the past few years and that eradication of malaria "is technically and economically practicable within the next ten years."¹⁵ In Greece, the reduction in anophelism, or malaria vectors, was attributed to the government's anti-

malaria campaign of 1945. However, in 1972, an increase in anophelism was attributed to the end of DDT application a few years earlier. These case studies of the effectiveness of DDT in controlling malaria show how important international governments considered the insecticide in the fight against infant deaths and rapid population decline.

During the 1930s, rice cultivation in Greece was restricted because of malaria but permitted again in 1972 because of the anti-malaria campaign, making rice an export crop for Greece.¹⁶ Lt. Col. Daniel E. Wright was considered the pioneer in the use of DDT to control malaria in Greece and became the Lieutenant Colonel of the Public Health Service in 1942 as a malariologist. In a letter to Dr. T. A. Parran, the surgeon general of the Public Health Service, Crawford F. Sams described Colonel Wright as “of the greatest assistance in carrying out malaria control measures in general throughout the theater.”¹⁷ These documents about Wright all seem to send similar messages, that the anti-malaria campaign should be continued in order to prevent widespread disease and death around the world and to preserve economic viability.

DDT was heavily used in Italy during and after World War II. The first such use came in 1943 by the United States to control a typhus outbreak in Naples. The chemical was sprayed carelessly throughout the slums without regard to possible side effects for about three million people, as the full extent of its toxicology was not known. The typhus outbreak was brought under almost immediate control in only three weeks, as 73,000 people were sprayed per day and 1,300,000 people were treated, demonstrating the awesome power that the new chemical had on infectious diseases.¹⁸ Once again, one can see why many national governments around the world placed such emphasis on the relatively new insecticide based mainly on case studies from other nations.

PUBLIC OBSTACLES AND EMERGING SCIENTIFIC EVIDENCE

Despite eradication of malaria as a major factor in the use of DDT, public ignorance of DDT's side effects was also prevalent. During the 1920s, about twenty years before the introduction of DDT, the Bureau of Chemistry of the Department of Agriculture set standards for residues on food from insecticides. By the time of DDT's introduction, doctors, farmers, and government officials already expressed concern over the issue of residue, but political transparency was lacking at the time. During the 1960s, scientific research, the emergence of other health problems, such as asbestos, and the creation of public interest groups all led to challenges to the use of DDT. The lack of transparency, however, and the fact that the debates over the chemical's use took place behind closed doors prevented the general public from seeking out the truth about side effects.¹⁹ Furthermore, the Public Health Service also devised a set of criteria during the 1940s for determining whether DDT was safe to use.

The Public Health Service concluded that if people exposed to abnormal amounts of residues were healthy, then the general public would be too. They also decided that the burden of proof be laid upon those that would ban a chemical and not those who produced it. Opposition consisted of the Food and Drug Administration (FDA) and some scientists, who stated that safety should be evaluated based on chronic effects and not "classical poisoning," or chemical doses that did not yield effects. This meant that they supported placing the burden of proof upon those who produce the chemicals and therefore expose the public to danger. Unfortunately, the conflict was heavily in favor of the producers, which shows the value of political power and the associated lack of public interest in the issue.²⁰ When DDT became widely used by 1946, the FDA and the Department of Agriculture essentially became agencies that served as interest groups. Their concern was not as much

about the preservation of public health and safety as much as it aimed to help the chemical industry avoid difficulty and therefore receive annual funds.²¹ This led to both positive and negative public opinions of pesticides during the 1960s.

Public support of pesticides can also be seen during the 1960s, even after *Silent Spring's* publication. In 1969, the Department of Agriculture temporarily banned DDT while Congress called for a national embargo on the chemical. Two primary fears that resulted in the stricter regulation of DDT were possible bans on other chemicals and the higher costs of alternatives.²² These concerns all came to the forefront without regard to how DDT might affect human health. There were also many who did not agree with what Carson had to say about DDT in her book. Some considered Carson's book no more than an alarmist literary piece that did nothing but use emotional language to create a stir within the public and practically promoted a return to dark ages riddled with disease.²³ This type of public opinion created yet another obstacle toward banning DDT, despite emerging scientific evidence of the chemicals' side effects. In 1964, the American Public Health Association reported that, although DDT was still a major threat, the use of the insecticide on cotton fields in Central America was contributing to the resistances to DDT that the mosquitoes began to develop.²⁴ This proved to be new scientific evidence that the public had not previously been exposed to when discussing the seemingly infinite wonders of DDT.

On the eve of World War II, the Food and Drug Administration and toxicologists had only just begun to study the issue of cumulative poisoning. Acute poisoning occurs as a result of negligence toward DDT spray residue, while chronic or cumulative poisoning is the result of prolonged consumption of residue and a subsequent buildup of poison that creates serious health problems.²⁵

Another major argument that arose from new scientific research was that with such a strong and effective poison, it was only inevitable that certain beneficial insects and other wildlife would perish. One study conducted near Clifton, Pennsylvania, resulted in the poisoning of fish within two days of spraying DDT along Ash Creek. The study concluded that DDT should only be used in extreme circumstances, and then only after weighing the value of beneficial forms of life that may be affected by its use.²⁶ This study is an example of newfound scientific knowledge when considering the possible effects that spraying DDT has had on beneficial forms of life.

The spraying of DDT also had a strong influence in eradicating elm disease. In 1949, Dutch elm disease began to inflict American elm trees, and DDT was used to kill insect carriers of the disease. Spraying occurred on college campuses in the Midwest in order to preserve their elms, and, after drinking rainwater and eating earthworms, many robins soon died. Scientists examined the robins and found that they contained indirect but lethal doses of DDT within their brains.²⁷ During an interview with ornithologist Joseph J. Hickey, Thomas Dunlap asked him how he became interested in the hazards of DDT. Hickey referred to a collegiate experience involving the spraying of elms. At the University of Wisconsin, DDT was sprayed for elm disease control, and soon robins and yellow warblers began to die all across campus, requiring years for their numbers to replenish.²⁸ In 1960, total robin mortality was estimated to be at about 85% for each spraying, and throughout Wisconsin, three years of consecutive spraying reduced breeding-bird populations by 30% to 90%, marking a substantial decline in the robin population.²⁹

A 1963 study showed the ill effects that the use of "toxic chemicals" had on peregrine falcon populations in Great Britain. These chemicals became the single most important factor in the rapid decline of the falcon

population.³⁰ The falcons in Great Britain were also found to have been victims of bioaccumulation of DDT from their prey and developed no physiological adaptation to the toxins.³¹ Hickey was also involved in a conference of scientists in 1965 that discussed the reproductive issues of peregrine falcons in both North America and Europe. The falcons' eggshells were breaking, and in Britain the scientific evidence had been collected in laboratories, while in the United States it was not. After learning of the results of the British tests on the falcon eggs, American scientists began to conduct similar research; only in 1968 was Hickey fully convinced that DDT was the cause of the thinning of the falcon eggshells.³² Again, these studies became examples of scientific evidence that was brought to the public's attention, but also not present at the time of *Silent Spring's* publication.

THE EPA AS AN AVENUE FOR REGULATION

The third and arguably most significant factor in answering the research question was the US political climate during the 1960s. More notably, the absence of the EPA as an independent agency to administer restrictions on pesticides was the main reason why the original political structure did not allow for a quick ban to DDT despite public outcry and scientific research. Once scientific evidence began to reveal many of the side effects and health risks associated with the widespread use of DDT, the US government also began to take notice. The President's Science Advisory Committee (PSAC), which was created in 1951 by Harry Truman, consisted of a board of scientists that would directly advise the president during the 1960s. One report by the PSAC in 1963, which was ordered by President John F. Kennedy, recognized that pesticide chemicals no longer only affected certain areas and special interest groups. The report admitted that not only did these chemicals travel great distances within the

natural environment, but they also persisted for a long time.³³ The experiments with animals to detect levels of toxicity began to be compared to similar effects in humans, despite the fact that these effects were not initially apparent.

Because of the evidence of the presence of harmful chemicals in major rivers, groundwater, and wildlife in the United States, the PSAC also agreed that further research of side effects was required, and that agencies like the Department of Health, Education, and Welfare; the Food and Drug Administration; and the Department of the Interior should lead campaigns to eliminate the use of persistent pesticides except for those that were necessary to “control disease vectors.” In addition, the PSAC report credited the developing public awareness to *Silent Spring* and Rachel Carson, which led to more transparency concerning the risks of using pesticides, such as DDT.³⁴ The PSAC also began to realize that despite DDT’s seemingly awesome power when used to eradicate malaria, the disease still persisted. Malaria was still the leading cause of death around the world, and the PSAC was beginning to suggest to the US government other methods in eradicating the disease that were both effective and financially feasible. Moreover, they stated that they had essentially crossed the point of no return; the presence of the chemical in the environment would only accumulate further and begin to show effects in plants and wildlife.³⁵

On December 2, 1970, President Richard Nixon created the EPA. This federal agency was created to deal with “research, standard-setting, monitoring, and enforcement with regard to five environmental hazards; air and water pollution, solid waste disposal, radiation, and pesticides.” It would also be responsible for detecting and mitigating environmental problems both locally and nationally, with the intent of turning the 1970s into a decade of environmental recovery.³⁶ The creation of the

EPA would give the United States one independent agency, instead of fifteen units, that had the authority to deal with all national and local environmental problems, including pesticides. This would therefore prove more effective than the PSAC, a committee of scientists who could only “advise” the president.

The creation of the EPA also represented a shift in pesticide regulatory authority away from the Agriculture Department and toward the newfound EPA. In 1971, The National Academy of Sciences, a panel of scientists, convened and decided after a seven-month hearing that the elimination of DDT was necessary. William Ruckelshaus, the first administrator of the EPA, issued an order with a similar sentiment that would shape the history of public interest in the environment and environmental law. He concluded that the costs (wildlife and ecosystem degradation) of the use of the pesticide outweighed its benefits.³⁷ This statement also coincided with the 1963 report by the PSAC that called for the elimination of persistent pesticides.³⁸ In the spring of 1972, Ruckelshaus banned DDT for pest control in the United States because of its persistence in the environment and carcinogenic properties. During the same year, Nixon also disbanded the PSAC. This decision would set a precedent for regulation that ruled in favor of protecting human health over economic concerns, a movement that was assisted by Rachel Carson’s efforts, which began with the news of the Cape Cod bird kills in 1958.³⁹

CONCLUSION

Rachel Carson, despite being a catalyst within early environmental movements and a synthesizer of scientific research into a public medium, also had to overcome the political interests of some within the scientific community. Some saw *Silent Spring* as a danger to their reputations, but

Carson criticized these scientists for placing themselves above scientific truth in order to appease the chemical industry. In addition, some members of the National Academy of Sciences-National Research Council panel were, in fact, employed by chemical companies, and Carson's message would challenge them to "weigh their scientific integrity."⁴⁰ One important facet of Carson's book that should be noted is that her message was not to completely overhaul the chemical industry and ultimately cease all uses of DDT in the United States. Rather, Carson simply wished to make people more aware of DDT's side effects and argued for the public's right to know how they might be affected by its continued use. The resistance faced by the environmental movement of the 1960s may have been encouraged by that very sentiment, but that is a different issue entirely.

Another clear and significant obstacle during the process of establishing a federal ban on DDT that deserves separate research was the resistance by the agro-chemical industry. As an insecticide that was widely used in the agricultural sector to ensure high yields, DDT was something the chemical industry wanted strongly to preserve. In particular, the industry was primarily afraid that the ban on DDT would lead to similar bans on other chemicals in use. This fear also led to reckless blame of environmental organizations, such as the Environmental Defense Fund, as contributors to a sort of "dark conspiracy" to eliminate all pesticides, thereby severely damaging the industry.⁴¹ This paranoia and response displays the clear conflict of interest between regulatory efforts and the stance that this industry had on the value of DDT. Efforts by the agro-chemical industry clearly played a role in the delayed ban of DDT over this time period, a role which must be examined at great length. However, this paper focuses on three separate and equally important points pertaining to the delayed ban of DDT.

While many reasons exist as to why it took ten years to ban DDT after the publication of *Silent Spring*, the insecticide's effectiveness in fighting malaria, public ignorance over the side effects of DDT before scientific research revealed the ill effects of DDT on wildlife, and the creation of the US Environmental Protection Agency in 1970 proved especially significant. Beginning with the publication of Carson's book, the public concern over DDT and scientific research of the 1960s finally culminated with the 1972 ban. However, understanding when the ban was imposed can only be achieved through the study of these three major obstacles: DDT was proven to be effective in eradicating malaria during and after World War II, scientific research did not exist that would reveal things like insect resistance and effects on wildlife, and a single agency did not exist to handle multiple environmental issues. Upon examining these reasons behind the time lapse between *Silent Spring* and the ban of DDT, one can begin to grasp the importance of Carson's message: Humans can utilize technology with good intentions, but can also use the same technology to harm not only the earth, but their own well-being.

¹ Rachel Carson, *Silent Spring* (Boston: Mariner Books, 2002), 297.

² Thomas R. Dunlap, *DDT, Silent Spring, and the Rise of Environmentalism* (Seattle: University of Washington Press, 2008), 58.

³ Thomas R. Dunlap, *DDT: Scientists, Citizens, and Public Policy* (Princeton: Princeton University Press, 1981), 98.

⁴ Richard Tren and Roger Bate, *Malaria and the DDT Story* (London: The Institute of Economic Affairs, 2001): 35, <http://www.iea.org.uk/files/upld-publication26pdf?.pdf>.

⁵ Charles F. Wurster, *A Case Study: The Decision to Ban DDT* (National Research Council, 1975), 7-9.

⁶ National Pesticide Information Center, *DDT General Fact Sheet*, 3.

⁷ Natural Resources Defense Council, *The Story of Silent Spring*, <http://www.nrdc.org/health/pesticides/hcarson.asp>.

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- ⁹ National Pesticide Information Center, *DDT General Fact Sheet*, <http://npic.orst.edu/factsheets/ddtgen.pdf>, 2.
- ¹⁰ *Ibid.*, 2-3.
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- ¹² *Ibid.*, 27.
- ¹³ *Ibid.*, 31.
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- ²⁵ Paul B. Dunbar, "The Food and Drug Administration Looks at Insecticides," in *DDT, Silent Spring, and the Rise of Environmentalism*, ed. Thomas R. Dunlap (Seattle: University of Washington Press, 2008), 53.

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- ²⁷ Roy J. Barker, "Notes on Some Ecological Effects of DDT Sprayed on Elms," in *DDT, Silent Spring, and the Rise of Environmentalism*, 66.
- ²⁸ Thomas R. Dunlap, "Interview with Joseph J. Hickey," in *DDT, Silent Spring, and the Rise of Environmentalism*, 81.
- ²⁹ Robert Rudd, "Pesticides and the Living Landscape," in *DDT, Silent Spring, and the Rise of Environmentalism*, 78.
- ³⁰ "Editorial from *Bird Study*," in *DDT, Silent Spring, and the Rise of Environmentalism*, 68.
- ³¹ Derek A. Ratcliffe, "The Status of the Peregrine in Great Britain," in *DDT, Silent Spring, and the Rise of Environmentalism*, 74.
- ³² Dunlap, "Interview with Joseph J. Hickey," 81-84.
- ³³ President's Science Advisory Committee, "Use of Pesticides," in *DDT, Silent Spring, and the Rise of Environmentalism*, 104-105.
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- ³⁵ Society for Science and the Public, "More Pesticide Research," *The Science News-Letter* 83, no. 22 (1963): 341, www.jstor.org.
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- ³⁷ Charles F. Wurster, "A Case Study: The Decision to Ban DDT," 1975, 7.
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