# Rachel Carson: 1907–1964*

More than 50 years after the death of Rachel Carson, her books continue to be in print. They are bought, read, and inspire future generations of environmentally concerned citizens and activists across the world. To understand what motivated Rachel Carson towards a passionate defense of the environment, we need to understand the times in which she was born and appreciate the landscape that shaped her fundamental interest in nature.

Born in 1907, Rachel Louise Carlson grew up in a home along the Allegheny river, bordered by pine forests and wetlands. Her father, Robert Carson, did not study beyond high school, but her mother, Maria Frazier McLean, was a highly educated school teacher who had to stop working after marriage. Rachel grew up in the rural town of Springdale, in Pennsylvania, on a large, 64-acre rural property with apple and pear orchards and farm animals. Their home was a small log cabin that lacked central heating and indoor plumbing. But the privations of living on a small income were compensated for by other opportunities. Maria had a large kitchen garden, and Robert grew roses on their property.

Much younger than her elder siblings Robert and Marian, Rachel grew up spending time mostly with her mother—her sister and brother were at school for much of the day. Her mother took her for long walks in the woods, where she developed a keen sense of observation and an eye for detail. This knowledge of the world made its way into her early artwork and books. As a child, she was particularly fascinated by the books of Beatrix Potter, and the classic children's book *The Wind in the Willows*. She wrote early, and often, first producing handwritten and hand-illustrated books for domestic consumption, with stories and poems on animals. Later, at the age of eleven, she published her first article on nature in a local magazine *St. Nicholas*, getting paid for articles she wrote in this and other magazines from the young age of fourteen.

After completing school, Carson went to the Pennsylvania College for Women. Interested in both literature and science, she joined the College as an English major but eventually transferred her major to Biology. In making this choice, she was heavily influenced by Mary Scott Skinker, the head of the biology department, who shaped her decision to pursue an advanced degree in science. When she came home in the summers, she was saddened to see the changes in the environment around her. At one end of the town, the Harwick Coal and Coke Company spewed sulphur into the air, while at the other end, the West Penn Power Company generated its share of pollution, turning the Allegheny river black.

After completing an undergraduate degree, she moved on to the prestigious Johns Hopkins

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University, the oldest research university in the USA. She registered for a Masters in Zoology, becoming one of the few women to receive a full scholarship. As her studies progressed, however, her family situation began to decline. Her family came to live with her, and she had five dependent family members to partially support, including her parents and her siblings. Despite graduating with an impressive thesis on the relatively esoteric subject of the evolution of the fish urinary system, she could not accept a PhD position at Johns Hopkins—she needed to get a job to supplement the family's shrinking income.

With her father's death in 1935, the family situation became even more precarious. Although Rachel Carson applied for several teaching jobs, there were few positions available, especially for women. Instead, drawing on her formidable writing skills, she was hired by the US Bureau of Fisheries to write scripts for a radio programme on marine life. This turned out to be a success. She embarked on a new career, one that combined both her passions—writing and science. Carson began to write science articles regularly for newspapers and magazines. While writing, she kept looking out for secure positions. She was eventually hired as a full-time junior aquatic biologist at the Bureau in 1936. Although overqualified for the post, she was fortunate to get it, being one of only two professional women working in the male-dominated government group of scientists.

Her job as a government scientist gave her numerous opportunities to explore the aquatic biodiversity of Chesapeake Bay. Her famous trilogy of books on the ocean, *Under the Sea-Wind* (1941), *The Sea Around Us* (a 1951 bestseller), and *The Edge of the Sea* (1955), grew out of a government pamphlet on fish, based on which she wrote 'The World of Waters', an extraordinary 4-page essay published in *The Atlantic*. The essay combines lyrical language with scientific accuracy. It begins thus: "Who has known the ocean? Neither you nor I, with our earth-bound senses, know the foam and surge of the tide that beats over the crab hiding under the seaweed of his tide pool home; or the lilt of the long, slow swells of mid-ocean, where shoals of wandering fish prey and are preyed upon, and the dolphin breaks the waves to breathe the upper atmosphere. Nor can we know the vicissitudes of life on the ocean floor, where the sunlight, filtering through a hundred feet of water, makes but a fleeting, bluish twilight, in which dwell sponge and mollusk and starfish and coral, where swarms of diminutive fish twinkle through the dusk like a silver rain of meteors, and eels lie in wait among the rocks."

What a breathtaking ability to write, at once transfixing the reader, and immersing her within the world of the ocean.

The article revealed Carson's talents for science writing to the world at large, but the books that transformed the world of environmentalism were slow in the coming. Her piece in *The Atlantic* had drawn the attention of Simon & Schuster, the publishing house in New York. Simon &

Schuster agreed to take the book, but could not offer her an advance. A few months before, Rachel's older sister Marian had passed away, dying from pneumonia at the age of 40. Rachel and her mother had taken on the care and support of her sister's young daughters, and she needed to supplement her salary.

She began to write more extensively, publishing several articles for *The Atlantic* magazine on wildlife. It was at this time that she first began to raise the topic that would later occupy most of her attention and focus—the decline of wildlife and the human-driven destruction of nature. She proposed writing pieces on the slow poisoning of people and wildlife because of environmental pollution. But magazine editors were not interested in such grim topics. Persevering with her book, she eventually managed to complete *Under the Sea-Wind* in 1941. The book received widespread critical acclaim from fellow scientists and naturalists. Unfortunately for Carson, barely a month after it was published, World War II began, and the sales of the book were badly affected.

Her life progressed on other professional fronts, however. Carson received promotions at work. Alongside her science writing, she became increasingly involved with writing informational material and policy planning for the Bureau of Fisheries. Her heavy workload, coupled with the constant stress of family responsibilities, began to take a toll on her health. She gained experience with writing articles on topics as diverse as bats, bivalves, and milkweeds, but was frequently frustrated with the experience of having to pitch her articles to magazines who had fixed notions of what was a saleable piece of public interest. She, however, was keener on getting her readers to develop a 'deeper appreciation of nature'. With science writing increasingly captivating her mind and imagination, she grew steadily dissatisfied with her everyday work as a government scientist, looking out for jobs in magazines such as the *Reader's Digest*, and in conservation organizations like the National Audubon Society. But, as was the case through much of her life, she was unsuccessful because of external events beyond her control. World War II had ended, and civilian jobs were in short supply. Conservation organizations were hard hit by funding crunches and had no jobs to offer her.

But the events that constrained her also provided an opportunity. Ever resourceful, she seized it. With the end of the War, several classified documents on military research were slowly becoming available. A new chemical, dichlorodiphenyltrichloroethane or DDT, was gaining popularity as a way to control insect pests. Wildlife biologists, including some government scientists, were concerned about the impacts this pesticide could have on fish and wildlife, and on birds that depended on insects. Her access to government documents provided her with unique insights into the impact of the post-war emphasis on economic growth on nature. At the same time, she went on numerous official assignments to wild places and biodiversity refuges across the USA, all the while taking extensive notes, extracting valuable background

information and seeking out expertise to increase her already substantial knowledge. All the while, she continued writing, publishing a series of government booklets on 'Conservation in Action', each an in-depth presentation of an ecological refuge in a different part of the USA. She wrote numerous magazine articles as well.

The stress of keeping two jobs going, one as a government scientist and the other as a freelance writer working late into the night and on weekends, was beginning to take its toll on her health. Already frail, she was hospitalized thrice between 1945 and 1947, for various surgeries. She had to financially support her mother and nieces. Coming as an additional blow, her former college teacher, friend, and mentor, biologist Mary Scott Skinker, passed away from cancer in 1948. Rachel had kept in touch with her through the decades and was shattered by her death.

Rachel was nothing if not persistent though. Working through crisis after crisis, she started on her second book on oceans. Unable to take leave to write the book because of financial reasons, and increasingly unable to find the time and energy to write the book after a full day's work, she was very relieved to receive a Saxton Fellowship. This made a big difference to her writing career, enabling her to take leave from her government job to focus on the book. *The Sea Around Us* was published in 1950 by Oxford University Press. This book became an immediate success. Nine out of its twelve chapters were condensed and published in the well-known magazine *The New Yorker*. Other chapters were published in other magazines. She made more money that year from magazine sales than from her government salary—a major relief since family responsibilities continued to require her financial attention.

As her financial anxieties eased, however, her health issues resurfaced. In 1946, she had undergone surgery to remove a benign tumour in the breast. In 1950, she had to have another surgery, this time to remove a second tumour. She was told that the tumour was not malignant, and she did not require any further treatment. Relieved, she did not question this decision but returned to her field visits, resuming work on the third of the ocean trilogies. Despite several obstacles and delays along the way that further fueled her anxiety, *The Sea Around Us* was eventually published and became a huge public success. Carson was featured in columns and feted with fan mail by readers.

As with her previous writing, *The Sea Around Us* was a tour de force, combining her deep knowledge of ecology with a passion for conservation, and a strong poetic voice that expressed her feelings in ways that touched every reader directly, and personally. The book reached *The New York Times* bestseller list within three weeks of publication, and stayed on the list for an impressive 86 weeks. She was besieged by requests for television appearances and interviews, most of which she declined. Thankfully, she was on a Guggenheim Fellowship that had enabled her to take leave from her government job for a year, and focus on writing. Her

family troubles did not cease, but as ever, she juggled them alongside her work. She looked forward to her visits to field sites, which gave her what she craved for the most—time spent away from crowds, amidst nature.

Receiving multiple awards and speaking invitations, she grew more used to speaking at large public events, and to dealing with critics. Many readers commented on her gender, noting that they were surprised that a woman could write such a book. This undoubtedly annoyed her, as it would have most women. Some reviewers seemed surprised that a book on science could attract such wide readership. Even her publishers, Oxford University Press, failed to anticipate the demand and printed such few copies that they struggled to meet requirements, leaving many readers disappointed. Others scoffed at her books for being too poetic—precisely the aspect that attracted readers to them. Carson, as always, expressed her view of this objection eloquently, saying "The winds, the sea, and the moving tides are what they are. If there is wonder and beauty and majesty in them, science will discover these qualities. If they are not there, science cannot create them. If there is poetry in my book about the sea, it is not because I deliberately put it there, but because no one could write truthfully about the sea and leave out the poetry." Readers agreed on the power of her prose. By 1951, the book had sold over 250,000 copies. The success of the book, and the financial stability this afforded her, finally enabled her to resign from government service in 1952.

While she worked for the US government, Carson had to be careful not to openly criticize the national policies. After her resignation, she was finally free to speak her mind. Powerful private investors and businessmen influenced political leaders to approve changes that would impact the environment, and Carson began to speak out more openly on these topics. With the publication of her next book, *The Edge of the Sea*, in 1955, she gained even more popularity.

Being a woman had made it much harder for Carson to succeed at her work for multiple reasons, domestic chores being one of them. Her increasing financial status now made it possible for her to hire domestic assistance, to relieve her from some of the duties at home such as cooking for her elderly mother, leaving more time for her to dedicate to her writing. Of all the new accolades that poured in, she was particularly pleased with one. Her old undergraduate college, Pennsylvania College for Women (which had been renamed Chatham College) presented her with an award for being a distinguished alumnus.

But life was never going to be easy for Carson. At a time when she wanted to focus all her energies on research, writing and communication, her domestic challenges began to worsen again. Her mother's health further deteriorated, and after a particularly nasty fall, she required round-the-clock attention. Her niece—one of the daughters of her sister, who passed away some years ago—took ill and died as well. Close to fifty years, battling fatigue and health

issues of her own, Carson had to take over the charge of raising her niece's orphaned five-year-old son. She continued to squeeze out time to focus on other writing projects, including the publication of a children's version of *The Sea Around Us*. But her time was even more constrained than before.

The post-war world around Carson was changing rapidly. The bombing of Hiroshima and Nagasaki had demonstrated the destructive capabilities of the atomic bomb in 1945. The daily news was full of stories that spoke of the immense power and economic potential of science. The Soviet Union launch of two satellites, Sputnik I and Sputnik II further sharpened public appetite for stories on science. Carson was worried about the impact of large-scale scientific interventions on the environment. Pesticides were one such intervention. An invasive fire ant species had spread into forests and agricultural fields across many parts of the USA, destroying crops. The US Department of Agriculture, or the USDA, planned to spray thousands of acres of land with pesticides such as chlordane, dieldrin, aldrin and DDT. Environmental organizations such as the Audubon Society were worried about the impacts this could have on ecosystems, killing out all insects and impacting the entire ecological food chain. Other branches of the US government, such as the Fish and Wildlife Service, also objected. Local citizen groups raised alarms, fought cases in court, and wrote letters to the newspaper, trying to stop mass spraying of insecticides from the air. They described how such programmes poisoned the soil, water and air, leading to widespread bird and wildlife death. US Congressional Committees held hearings to investigate human health impacts of increased chemical use.

Carlson was in a unique position of strength to write about such a complex issue. The concerns of many citizens, including many women environmentalists and activists who raised alarms, were dismissed as being hysterical and filled with misinformation. Carlson had built a solid public reputation as a careful, well-informed scientist. She contacted several former colleagues at various US government agencies to collect scientific material that not only demonstrated the environmental impacts of these new pesticides but also their long term human impacts on health, including reproductive damage and cancer. Some of her former colleagues, as disturbed as she was, but powerless to act within as government employees, shared important confidential information with her under conditions of anonymity.

Meanwhile, the USDA spraying continued and expanded. Because of her family constraints, she originally planned to write a few magazine articles and a short quickly produced co-authored book. The deeper she dug into the topic, however, the more she realized its significance. Her concerns about the impact of pesticide use were related to more fundamental questions about the impact of humans on the world. Such questions had plagued her throughout her life, ever since she was a young child when she wrinkled her nose at the stink of polluted air that made its way from the local glue factory to her isolated farm. Carlson now wanted to

integrate these into her work.

Her mother's health continued to deteriorate. She passed away in the middle of Rachel's research. Diving deeper into the science, she buried herself in work, finding it a welcome distraction from grief. She read intensively, looking at literature on cancer, human physiology, genetics, evolutionary biology, and chemistry. During the course of this widespread reading, she became convinced that, while her book would speak about ecology and environmental impacts, its most important focus would be to inform the American public about the major impacts of pesticide use on human health. Insecticides, once sprayed, persisted in the soil, water and air. She wanted to share research that revealed how these chemicals were absorbed into the human body, and became accumulated in the liver and other key organs. Over time, such accumulation led to slow, significant poisoning, even affecting future generations by disrupting genetic cell function. The link between exposure to pesticides and cancer was also becoming increasingly evident, and she wanted to devote part of her book to explaining such a link. From a short, quick article, the book was steadily expanding in complexity, scope and grand vision. It was a masterpiece of work that demanded all her attention.

At the same time, she could not forget that was the sole guardian of a small, sickly boy, her grand-nephew, who needed a great deal of her attention. He had gone through many losses in his young life, and clung to her as a source of support. By 1960, she had collected a vast amount of material for the book, but her health gave way under the strain. A duodenal ulcer, followed by pneumonia and sinus infection, laid her low. But indefatigable as she was, she soldered on through her illnesses. The chapter on cancer took a great deal of her attention, expanding into two chapters.

A few months later, a more serious condition struck. Doctors had found several cysts in her breast. Because she had two previous surgeries to remove other cysts, this time her doctor recommended a mastectomy—complete removal of one breast. This time, they found evidence of malignancy. Despite her asking, her doctor did not tell her directly that her cancer was malignant, though. He did not prescribe radiation treatment. The surgery was extensive, and for months, she struggled with pain and loss of energy. She dictated sections of the book into a tape recorder from her bed, working late into the night on many days.

Later that year, she wrote a remarkably prescient preface to a reprint of her earlier book *The Sea Around Us*. In this, she drew parallels between the dangers of radioactivity and the use of artificial chemicals like pesticides. Both, she explained, were driven by a strong postwar belief in the invincible power of science. Humankind now believed that they could reshape the world around them with technology, intervening at will, whether to eradicate harmful pests or to conduct experiments on nuclear energy. The problem, she explained, was that these new

technologies had long term consequences such as cancer, or radioactive contamination of the ocean floor, which were damaging and irreversible. With this out of the way, she spent the rest of 1960 working steadily on the book, which now had a tentative title *Silent Spring*. The name came from the famous poem by John Keats, *La Belle Dame sans Merci*, whose opening stanza describes a lake whose environment has become so degraded that there are no birds to sing.

By November 1960, her health problems had resurfaced. A swelling below her ribs indicated a recurrence of the tumour. She was frustrated with her doctors, who had still not admitted that she had a malignant tumour that needed continued medical attention. Carson had much greater confidence in her new doctor, who started her on radiation therapy. She had a bacterial infection in her joints, which gave her severe pain, and she had difficulty moving around. The radiation treatment weakened her. She continued working on the book, but progress was painfully slow, and she was frustrated. In 1961, she faced further health challenges. Cruellest of all, she developed an inflammation of the eye, which impacted her ability to read and write for several weeks. She soldiered on, finding new ways to tackle revisions. Chapters were read to her, and she revised them by sound. By 1962, the book—a *magnum opus* by now—was finally done. To confirm her conclusions, she sent chapters to several expert readers—scientists and government experts—who helped her hone and strengthen her arguments. *Silent Spring* was a severe indictment of modern human approaches to techno-fixing the world's problems. She anticipated that there would be a severe backlash. The fact that a woman wrote it could give people all the more reason to label her an alarmist crackpot. She was determined to make the science as strong as possible.

Her cancer had spread further, and she restarted radiation therapy in 1962. At the time when she was feeling her weakest, she needed to attend and speak at public events with influential people. She ordered a grey wig, as her hair had thinned out and fallen because of the radiotherapy. She skipped several public appearances because they conflicted with her medical appointments. The cancer continued to spread. She wanted to keep it a secret from the public, concerned that gossip about her health would distract from the important points she wanted to make.

The months that led up to the publication of *Silent Spring* were hectic and filled with activity. Condensed excerpts from the book were published in *The New Yorker* magazine, and leading newspapers wrote about the book. Chemical manufacturers wrote letters of protest, and USDA officials were inundated with complaints from consumer groups, activists, and politicians. One chemical manufacturer, the Velsicol Chemical Company of Chicago, even threatened to sue the publishers. For a while, it seemed like the publication of *Silent Spring* might have to be delayed. The publishers stood firm, however, and the book was finally released on 27 September 1962. She had begun planning the book in 1958—it expanded in scope, and occupied her mind over the next few years, but she felt deeply satisfied with the outcome.

The next few months were very hectic. Carlson's book was the topic of conversation at many events, and she gave many talks and interviews. By November, however, her poor health was obvious to those who met her. The success of the book was deeply worrying to the chemical industry, whose companies spent hundreds of thousands of dollars in various efforts to discredit Carson. They dismissed her as not being a qualified scientist because she lacked a PhD. They called her alarmist, and openly mocked her as a hysterical woman. But their attempts backfired. The controversy the book and its responses generated drew increased public attention, and more and more people purchased the book. From the Garden Club of America, an organization that comprised mostly of women homemakers, to the millions of people who watched a special report on television of the CBS Program on *Silent Spring*, public attention was firmly centred on pesticides and the irreversible harm that they caused to humans and other species on earth. The US Senate was forced to open investigations into this issue, in response to demands for government policies to regulate the indiscriminate manufacture and use of chemicals.

Future events vindicated her stand. As she struggled with her declining health, a massive fish kill that was traced to a pesticide company that released wastewater into the Mississippi River shaped the introduction of a draft Clean Water Bill. In between bouts of ill health and numerous trips to the hospital, she worked on drafts of articles, steeling herself to deliver a few important talks, including a speech made to the American Geographical Society in December 1963, accepting the award of the Cullum Medal. She suffered severe and continuous pain and battled heart problems that had arisen as a result of her cancer treatment. But by February 1964, the end was near. Carson wrote out a new will. The cancer had spread to her liver. She passed away at her home on 14 April. Her ashes were divided—some were buried next to her mother's grave, while her dearly loved friend Dorothy Freeman scattered the remaining ashes on the ocean. Rachel was one with the sea, as she had wanted.

Carson's grand-nephew, orphaned again at the age of 11, was taken in by a close friend of hers. Her work lived on, providing the impetus and scientific backing for rallies around the environment. Her lingering influence shaped fundamental legislations such as the US Clean Water Act in 1972, and the Endangered Species Act in 1972. It spurred a campaign to ban the use of DDT in the USA, which was discontinued in 1972. Public concerns about environmental regulation, stimulated by her research and writing, led to the formation of the US Environmental Protection Agency, which regulated pesticide and chemical use in agriculture.

Carson died just short of her 57th birthday. Despite her short life, plagued by financial difficulties, burdened by family responsibilities, and constantly battling ill health, she left an important legacy of writing behind. Her writing was an uncommon mixture of undeniable scientific facts and, a captivating lyrical style that captured the romance of nature.

Looking back at the immense influence that Rachel Carson has had on the world, it is difficult to imagine that her books may have never been written, given the number of obstacles placed in her way. Her remarkable life is a tribute to the power of her imagination and insight, her deep love for the world of nature, and above all, her determined persistence to make the world a better place to live in.

## Suggested Reading


**[1] Linda Lear, *Rachel Carson: Witness for Nature*, Macmillan, 1998.**

**[2] William Soulder, *On a Farther Shore: The Life and Legacy of Rachel Carson*, Crown, New York, 2012.**

**[3] The Life and Legacy of Rachel Carson, `www.rachelcarson.org`**



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