The Literary Aesthetic of Rachel Carson

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The Literary Aesthetic
of
RACHEL CARSON

by Patricia Borneman

English Writing Honors Thesis
Carroll College

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This thesis is lovingly dedicated to the memory of my mother, Mary Hamilton Walden (1924-1994), the first person to tell me about Rachel Carson’s Silent Spring.
Introduction

My thesis, as the title suggests, explores the literary aesthetic of Rachel Carson (1907-1964)—acclaimed author of *Under the Sea-Wind* (1941), *The Sea Around Us* (1951), *The Edge of the Sea* (1955), and *Silent Spring* (1962). Carson is best known for *Silent Spring* due to the controversy which surrounded its subject—the dangers of widespread, indiscriminate use of pesticides, especially DDT. However, prior to the publication of *Silent Spring*, Carson was already known for her best-selling books about the ocean, especially *The Sea Around Us*, which appealed to a wide audience comprised of naturalists and specialists in the sciences as well as people without a science or biology background. Carson's attraction is due to her ability as a writer who, as Paul Brooks writes, "could take the facts of science and transmute them into literature" (*Speaking* 4).

Why did Carson feel the need to "transmute" science into literature? Precisely how did she do it? What impact does her writing have on the ongoing development of writing about nature, science, and the environment? And who was Rachel Carson, the woman behind the legend? The answers to these questions would lead to an understanding of Carson's literary aesthetic which I have defined as "A tapestry of poetry, pathos, reason, and fact . . . . her compositional art, her ecological sensibility . . . . an intertextual literary ecology . . . . a delicate, but dynamic, equanimity between the senses, the soul, and the intellect in Carson's approach to nature as recorder of what she observes, feels, knows, and experiences."
In the canon of American literature about nature and the environment Rachel Carson places among the top ten most likely to appear on a list of writers who have achieved widespread recognition. Carson’s name consistently appears in anthologies, biographies, critical analyses, book reviews, and just about any article about nature writing, pesticides, ecology, and environmental science published since 1970. Oftentimes she is the lone female sitting on a panel beside Henry David Thoreau, John Muir, and John Burroughs. Sometimes Aldo Leopold is there, sometimes William Bartram, sometimes Barry Lopez. Other writers whose names are sometimes mentioned by ecocritics in the same breath as Carson are Henry Beston, E. B. White, Edwin Way Teale, Loren Eisley, and John Hay. Occasionally Sarah Orne Jewett, Mary Austin, Isabella Bird, and Annie Dillard make the list. Despite receiving numerous honors and awards in her lifetime, Carson probably never imagined that her name and her literary achievements would become so legendary. Now, in the form of this thesis, I am adding my voice to the growing discourse on Carson’s contribution to the genre known as ecological literature, or ecoliterature.

Here, at the beginning of the new millennium, with the fate of the earth hanging in the balance, questions still remain: what are we willing to sacrifice for the sake of a sproutless potato or mosquito-free patio? What exactly is all this bio-technological “progress” costing us in terms of clean water, soil, and air? Do non-humans have rights? What about ecosystems? Endangered species? Wilderness and open space? What about people’s relationship to nature? Have we become estranged forever, beyond a point of no return? If so, how do we reconcile our sense of difference, of separation, of superiority?
And, as an *Orion* Magazine editor asked, “How do we put soul back into the way we understand the world?”

The past few decades of the twentieth century have spawned hundreds of environmental and nature writers who endeavor to address these questions. Consequently, a new branch of literary criticism has emerged—ecocriticism—to study the body of literature that focuses on science, nature, and the environment. Professor Cheryll Glotfelty provides a good definition of ecocriticism in her introduction to *The Ecocriticism Reader*:

... all ecological criticism shares the same fundamental premise that human culture is connected to the physical world, affecting it and affected by it. Ecocriticism takes as its subject the interconnections between nature and culture, specifically the cultural artifacts of language and literature. As a critical stance, it has one foot in literature and the other on land; as a theoretical discourse, it negotiates between the human and the nonhuman” (xix).

By virtue of my topic and particular focus, as broad as it is, this thesis conforms to an ecocritical approach. As stated earlier, I am primarily concerned with understanding the phenomenon of Rachel Carson’s literary aesthetic, how she affected human culture and was affected by it, how she used the “cultural artifacts of language and literature” to enhance her writing about nature negotiating as she did between the “human and the nonhuman.” Clearly, Carson’s literary aesthetic has influenced the critical approach to ecoliterature as well as the craft of writing about science and nature.
When I first contemplated the idea of writing a long thesis as part of my fulfillment of a degree in English Writing, I knew right away what the subject would be. Writing about Rachel Carson's life and her contributions to the field of ecoliterature would give me the satisfaction of having read her entire body of work as well as all the critical analyses I could find. I could immerse myself in ecocritical texts, becoming well versed in the various related critical theories and rhetorical analyses being applied to ecoliterature, especially those directed at Rachel Carson and her literary works. And as a writing major, I could hone my writing skills while engaged in the dual process of discovery and illumination—challenging though it might be.

As a writing major, I have enjoyed the creative freedom to develop this thesis as the subject requires. That is, to allow it to reflect the aesthetic qualities and moods of the literary works I would be discussing and excerpting. Rather than separate out some individual aspect of Carson's work, I felt I should approach the subject in a holistic way, letting the texts guide the process of discovery and illumination. I began to see my thesis as an invitation, albeit a mandatory one, to embrace an author's entire life's work, to begin to expand my knowledge of ecoliterature in general. It would be an exploration, an embrace, and a tribute. A deep-sea dive into the abyss, a long migration to a place I know in my bones, but need to reawaken.

I take a deep sigh. The experience has been exhilarating. The research and reading has awakened my intelligence and heightened my awareness of particulars. I live in a world of metaphor and allusion. But I am closer to a true sense of the world and know that nature and science can be explained in more ways than one.
Writing this thesis has been exhausting and intimidating. Sometimes I doubted that it could be done. My only consolation and impetus to keep going comes from knowing that Rachel herself found writing an arduous, time-consuming task. I had to know it would all be worth it, just as her five books, countless essays, speeches, and letters have proved to be. I attempted to approach my study of Rachel Carson as she did her own research and writing: with the same (I could hope) multi-lensed focus, the same sense of wonder, the same aesthetic appreciation for beauty in nature and in lyric, the same fluidity of language and (gulp), the same ability to write in the organic form. Writing this thesis, then, became an exercise in faith, in the power of intertextual osmosis, and in patience.

This thesis is organized in two parts. Part One is a biographical summary of Carson’s life and work, drawn in large part from Linda Lear’s 1997 biography, *Witness for Nature*. I consulted two other biographies written in 1972 and 1983, watched an hour-long documentary about Carson, poured over letters she wrote, and gained a deeper understanding of Carson’s writing process through her speeches and essays on the subject. While not comprehensive, this biography provides a narrative chronology of the people, events, and experiences that led to Carson’s personal triumphs and literary success.

Part Two is a discussion of Carson’s literary aesthetic, supported with excerpts from the author’s published work, speeches, and letters as well as quotations from other writers, biographers, critics, and poets. A book-by-book explication follows the initial dive into critical analysis that serves as the heart of the thesis.
While certainly not complete, I wanted to acknowledge the legacy of Rachel Carson, and have included an Epilogue to this thesis to briefly mention two writers—Terry Tempest Williams and Sandra Steingraber—who, with their own remarkable lives and literary accomplishments—are carrying Rachel Carson’s banner into the twenty-first century.
PART ONE

Biography of a Nature Writer

I can remember no time, even in earliest childhood, when I didn’t assume I was going to be a writer. (Rachel Carson, Sorority of Women Journalists speech, 1954)

It is 1954. Rachel Carson, the soft-spoken author of *The Sea Around Us*, is the keynote speaker for the annual meeting of the Sorority of Women Journalists. Her audience consists of one thousand women. In what is considered the most autobiographical speech of her life, the usually-reserved Carson opens her heart and bares her soul to this room full of women writers. She talks about her love of nature, her education, her pursuit of a career considered unconventional for a woman, and her earliest sense of connection to and curiosity about the sea. She remembers as a child finding a fossilized seashell near the Pennsylvania farm where she grew up, hundreds of miles from the ocean. She fondly credits her mother for taking her into the meadow where she learned to delight in nature. And she speaks frankly about the choice she thought she had to make between a writing career and her newly-discovered passion for biology.

As a college freshman, Carson thought the two fields—writing and science—were incompatible. Many years later, when an essay she wrote about undersea life is published in the *Atlantic Monthly*, she realizes that science and writing can be combined into one career. Carson tells the journalists, “I was merely getting something to write about” (Lear, *Witness* 149).
That "something"—a love of nature in all its forms, a compelling curiosity about the origin and intricacies of life on earth, what it means to find a seashell on land so far from the sea—was nurtured early in Rachel’s girlhood on a small Pennsylvania farm surrounded by woods. Rachel Carson seemed born to a mission and knew it early in life. In a college essay about her goals in life, Carson writes that she hopes her college experience will give her “time to think, to ‘come to a fuller realization’ of herself and responsibly play her ‘part on the stage of [life]’”:

Sometimes I lose sight of my goal, then again it flashes into view, filling me with a new determination to keep the ‘vision splendid’ before my eyes. I may never come to a full realization of my dreams, but ‘a man’s reach must exceed his grasp or what’s a heaven for?’” (in Lear, Witness 32).

A profound sense of purpose, an indefatigable spirit, and a commitment to her “vision splendid” guided Rachel Carson throughout her life.

Rachel Louise Carson was born May 27, 1907, in Springdale, Pennsylvania, to Robert and Maria McLean Carson. Her older brother, Robert, and sister, Marian, born seven and five years before, were already in school when Rachel was a baby. According to Lear, Rachel’s father was “an elusive figure” who was frequently away on business and took little interest in developing their sixty-four-acre farm except to subdivide the downhill sections into house lots” (Witness 12). Throughout the 1920s, Mr. Carson was sporadically employed and the family was “more often poor than of modest means, and this privation probably shaped Rachel’s opportunities and her personality from the outset” (Lear, Witness 13). However, whatever the family lacked in material or social amenities,
Rachel’s mother made up in time and devotion to her children’s creative and spiritual development.

Maria McLean Carson had been raised in a household of strong-willed females. With Mr. Carson gone most of the time, Maria’s women-centered upbringing bolstered her role as the dominant parent in the family. She directed her children’s social activities and education, and made sure they attended church, but the family’s financial situation and isolation on the farm made it difficult to establish and maintain friendships in the nearby town. Fortunately, Maria’s love for literature and her background as a schoolteacher and pianist enabled her to bring music, books, and nature study into her children’s lives (Lear, *Witness* 13).

Carson’s immersion in nature study at the tutelage of her mother had a lasting impression on the developing writer. Maria was an enthusiastic follower of the popular nature-study movement, involving her children in the out-of-doors, using lessons provided in *Comstock’s Handbook of Nature Study*. Founder and editor, Anna Botsford Comstock, designed the handbook to “cultivate the child’s imagination, his perception of the truth, and his ability to express it” (Lear, *Witness* 14). Comstock began her career as an assistant to Liberty Hyde Bailey, the botanist who popularized the burgeoning turn-of-the-century nature-study movement. During this period, books and articles by women naturalists promoted an interest in nature, with a special focus on birds and bird lore. In addition to instilling in children a “love of the beautiful” in nature, the handbook offered the philosophy that nature was a holy entity and “conservation was, as Bailey said, ‘a divine obligation’” (Lear, *Witness* 13-14).
Thus inspired and equipped with lesson plans and guidebooks, Maria took advantage of the “sixty-four-acre laboratory” that surrounded their farm and introduced her children to natural history, botany, and birds. She also taught her children a basic respect for nature, instructing them to return collected “treasures” to the places where they had been found. Lear writes: “This kind of care for the natural world had a spiritual dimension that at least her youngest daughter embraced and would practice all her life” (Lear, Witness 15).

Concurrent with forays into the woods and along streams to watch for birds and observe insects, Maria also encouraged Rachel’s love of reading and writing. Her childhood favorites were the stories of Beatrix Potter, Wind in the Willows by Kenneth Grahame, and the novels of Gene Stratton Porter, “an apostle of the nature-study movement who believed that through nature a child was led to God. For Porter, studying wildlife was a source of moral virtue” (Lear, Witness 17). Rachel also read children’s magazines, especially the very popular St. Nicholas Magazine, “regarded by many as the best magazine ever published for children,” owing to the superior quality of the writing, illustrations, and printing (Lear, Witness 18).

St. Nicholas Magazine held a monthly contest honoring children’s best poems, stories, essays, drawings, and puzzles. In 1918, at the age of ten, Rachel’s first story—an award winner—was published in the League section of the magazine. When that happened, Lear writes, Carson “joined a distinguished group of poets, novelists, essayists, artists, journalists, and scholars who first saw their work in print in the pages of the League.” William Faulkner, F. Scott Fitzgerald, Edward Eslin Cummings, S. Eliot

Carson’s story, “A Battle in the Clouds,” won the silver badge for excellence in prose. The story was a true account of a Canadian World War I aviator who died in combat in France. Carson wrote her story after receiving a letter about the aviator from her brother Robert, who was serving in the Army Air Service. Carson wrote two more stories and an essay which were published in *St. Nicholas* Magazine. The topic of each piece concerned the war—a common and compelling theme for many of the young authors whose stories appeared in the magazine (Lear, *Witness* 19).

Despite frequent absences from school due to winter weather, Carson’s academic performance was exemplary. On those days when the children were stranded at home, Maria tutored them and Rachel was given free reign to read as much as she wanted. The authors she most enjoyed were Herman Melville, Joseph Conrad, and Robert Louis Stevenson (Lear, *Witness* 21).

In 1925, Carson graduated from high school and, largely through her mother’s efforts, was awarded a scholarship to attend Pennsylvania College for Women (now Chatham College). Planning to pursue a writing career, Carson naturally chose English composition for her major. Grace Croff, an assistant professor in composition, became Carson’s first mentor at the college. One of Croff’s comments on a term paper praises a characteristic in Carson’s writing that, according to Lear, became “a hallmark of Rachel’s mature writing”:
Your style . . . is so good because you have made what might be a relatively technical subject very intelligible to the reader. The use of incident and narrative is particularly good (qtd. in Lear, Witness 33-34).

Croff encouraged Carson to write for the school paper, *The Arrow*, and to submit her work for publication in the college's literary supplement, *The Englicode*, which she did the following year. Rachel developed several close friendships with students which complemented the intellectual companionship she shared with Croff. While most of her time was spent reading and writing, Rachel found time to actively participate in field hockey and basketball at the college. Despite her petite stature, Lear writes, Rachel was "quite scrappy and agile" (*Witness* 33).

Following her freshman year, Carson enrolled in a required science course taught by Mary Scott Skinker, a "dynamic, energetic, and absolutely glamorous" (Lear, *Witness* 37) biologist whose intelligence and passion for science would change Carson's life forever. "Awed by Skinker's knowledge and skills," Lear writes, Carson "wanted to learn all that Skinker had to teach. Her inner vision had been sharpened and expanded by their encounter" (*Witness* 37-38). Despite Skinker's academic integrity and dedication to her chosen career, the college's female president, Cora Coolidge, chose to promote a male teacher to head the department instead of Skinker, who had applied for the position.

Though Coolidge was a professional woman who had attained a prestigious academic position, she particularly disapproved of women pursuing careers in science, and did little to encourage Carson's new interest. Even so, Carson's initial enchantment with biology only became more intense. The biological sciences were still another avenue for Carson to experience her love of nature and Lear notes that Carson's "cognitive and
observational skills were suited” to the study of biology “in the same way that her poetic skills enabled her to transcribe what she saw outdoors” (Lear, *Witness* 39). Without question, Carson found herself at one of the most pivotal times of her life. Her mind and spirit were being charged with new possibilities and infused with a passionate curiosity that, unknown to her then, would lead to a deeper understanding of her “vision splendid.”

By the end of her sophomore year, Carson had added a science minor to her English major, but was seriously considering a complete switch to a biology major. During her junior year, Carson found herself weighing her lifelong plans for a writing career against a biology career, which at the time, meant teaching high school or college science. Very few women in the 1930s succeeded in the more lucrative and competitive research positions in government or business. In addition to limiting her chances for a rewarding career, Carson feared disappointing her mother, who had long dreamed of seeing her daughter become a writer.

Nevertheless, overriding these considerations was Skinker’s strong academic and professional influence which had come to supersede that of her mother’s and her esteemed writing professor, Grace Croff. Through her “sober dedication and . . . infectious love of discovery” Skinker demonstrated to Carson the possibility that “through the life sciences she might understand, rather than merely to observe, the natural world . . . A minor field in biology would not satisfy her. She wanted to immerse herself” (Lear, *Witness* 43). So, in 1928, Carson finalized her decision for science and switched her major to biology. Before graduating from Pennsylvania College of Women *magna cum laude* in 1929, Carson founded the college’s first science club and served as its president.
Despite the onset of the Great Depression, the years following graduation were
filled with promise for Carson, but they also found her struggling to stay afloat financially
while pursuing a graduate degree. Prior to Carson’s graduation from college, Mary Scott
Skinker had decided to leave her teaching job to earn a doctorate in zoology at Johns
Hopkins University. Not surprisingly, in 1929, Carson followed her mentor to Johns
Hopkins where she enrolled in the graduate program to study genetics. That summer, she
accepted a fellowship to study at Woods Hole Marine Biological Laboratory in Cape Cod,
where Carson saw the ocean for the first time. She also accepted a one-year scholarship
to study zoology at Johns Hopkins University.

While pursuing her master’s degree in zoology, Carson worked as a lab assistant to
a geneticist. For six summers in a row (1930-1936) she worked as an assistant biology
teacher at Johns Hopkins; during the school year she was a zoology assistant at the
University of Maryland. In 1932, Carson was awarded an M.A. in zoology from Johns
Hopkins. She then began taking courses at John Hopkins toward a doctorate degree in
zoology, but financial problems during the Depression forced her to scale back her course
schedule in order to teach part-time at Johns Hopkins and the University of Maryland.

During this time, Carson was the primary support for both her parents who resided
with her in a Baltimore home along with a divorced sister, Marian (a diabetic unable to
work full-time), and Marian’s two daughters, Virginia and Marjorie. Rachel’s brother,
Robert, lived in downtown Baltimore, but he provided little financial support to the family.
By 1934, with the deterioration of her father’s health and mounting financial burdens,
Carson was forced to end her graduate career and seek full-time work. She continued to teach part-time at the University of Maryland while searching for a better-paying job. To generate some income, Carson revised a few poems and essays from her college years and submitted them to magazines such as *The Saturday Evening Post*, *Collier's Poetry*, and *Reader's Digest*, but none responded favorably to her queries (Lear, *Witness* 77). Then, on July 6, 1935, Carson's father had an apparent heart attack and died, leaving Carson as the sole support of her mother, her sister Marian, and her two young nieces. Desperate for full-time work, Carson turned to Mary Scott Skinker for help.

Skinker had, by this time, completed her doctorate in zoology at George Washington University and had obtained a position as research parasitologist in the Zoological Division of the Department of Agriculture's Bureau of Animal Industry (Lear, *Witness* 78). Skinker enjoyed her work as a government scientist and she encouraged Rachel to take the civil service exam which would qualify her for a government job. Carson took three exams—junior parasitologist, junior wildlife biologist, and junior aquatic biologist—and scored a high 76.5 on the junior parasitologist exam. Skinker then suggested that Carson pay a visit to Elmer Higgins whom Carson had met prior to earning her master's degree (Lear, *Witness* 62-63). Higgins was now chief of the Division of Scientific Inquiry for the U.S. Bureau of Fisheries (later renamed the U.S. Fish and Wildlife Service). Higgins had no professional openings, but offered Carson an assignment to write the scripts for a series of seven-minute radio programs on marine life called "Romance Under the Waters" (Lear, *Witness* 78-79) When this project was
completed, her superiors were so pleased they asked her to write the text for a brochure on the marine life of Chesapeake Bay.

Using material gathered for the radio scripts, Carson wrote an essay titled "The World of Waters" for use in the brochure. Impressed with the quality of her writing, Higgins nevertheless thought the piece was "too lyrical" for a government pamphlet and suggested she submit it to the *Atlantic Monthly* instead. Lear writes that Carson was "surprised and enormously pleased" by Higgins' response to her writing, but she put the essay away (*Witness* 81) for almost a decade before revising it for its eventual publication.

Carson then began writing a series of newspaper columns for the Baltimore *Sun*. Her first article dealt with the decline of shad fishing in Chesapeake Bay. Lear notes that this and subsequent articles published in the *Sun* predicted the format and content of Carson's later writing:

... the conservation of a resource, a respect for nature's intricate processes, and the effects of human intrusion on nature. But it also reflected the research of a thoroughly competent marine biologist familiar with the population and habitat studies of this mid-Atlantic fish (*Witness* 79).

As Croff had observed on Carson's college compositions, this blending of ecological message with scientific fact would become Carson's trademark skill as a writer who demystified science for the general reader using vivid imagery and enchanting prose.

Carson continued to impress Higgins, who helped her land her first government job as junior aquatic biologist with the U.S. Bureau of Fisheries. Holding this position also earned her the distinction of being one of only two women—the first women ever employed at the Bureau of Fisheries on a professional level (Shirley Briggs, a long-time...
friend and colleague of Carson's, was the other woman) (Lear, *Witness* 82). As junior aquatic biologist, Carson was responsible for conducting fisheries research. She analyzed biological and statistical data, wrote reports, and produced brochures for the public on fish conservation. Carson performed a great deal of field work in this job, visiting Chesapeake Bay, interviewing fishermen, and touring industrial plants and conservation facilities.

By the end of 1936, Carson was happily engaged writing about marine biology until another tragedy struck the family. In January 1937 Marian died of pneumonia, leaving her two pre-teen daughters in the domestic care of their grandmother, Maria, and financially dependent upon their Aunt Rachel. Speculations as to why Carson never married often focus on the fact that for most of her life she was the responsible head of a household, with multi-generational family members solely dependent on her for survival. Witnessing Marian's failed marriage may also have strengthened her resolve to remain financially and emotionally invulnerable. When asked directly why she never married, Carson is said to have simply stated she had "no time."

In 1937, Rachel moved the family to Silver Spring, Maryland, to be near her office and research areas. Once settled in her new home, Carson found time to revise her earlier essay, "The World of Waters," and she sent it off to the *Atlantic Monthly*. The response from the *Atlantic* editor was gratifying: "We have everyone of us been impressed by your uncommonly little essay... The findings of science you have illuminated in such a way as to fire the imagination of the layman" (Lear, *Witness* 87). After making some suggested improvements, one of which was to change the title to "Undersea," Carson resubmitted the four-page essay to the *Atlantic* and it was published in the September 1937 issue.
essay's second paragraph coaches the reader to be prepared for the watery world they are about to enter:

To sense this world of water known to the creatures of the sea we must shed our human perceptions of length and breadth and time and place, and enter vicariously into a universe of all-pervading water. For to the sea's children nothing is so important as the fluidity of their world. It is water that they breathe, water that brings them food; water through which they see, by filtered sunshine from which first the red rays, then the greens, and finally the purples have been strained; water through which they sense vibrations equivalent to sound (qtd. in Lear, *Lost Woods* 4).

Valued by a major publisher for its literary merit and uncommon beauty, the publication of "Undersea" foretold the writing of her ocean trilogy and, as Carson herself once said, marked the official beginning of her writing career "after which everything else followed" (Lear, *Witness* 88).

Like a beacon to the publishing world, the appearance of "Undersea" in the *Atlantic Monthly*, a widely-read and respected national magazine, brought Carson to the attention of Quincy Howe, the senior editor of the New York publishing firm of Simon and Schuster, who wrote to ask if she had plans to write a book about the sea. Hendrik Villem van Loon, a journalist, cultural historian, and illustrator published by Simon and Schuster, also corresponded with Carson and praised her writing. With encouragement and assistance from Howe and van Loon, Carson began work on *Under the Sea-Wind*, a narrative on the life of several sea creatures, patterned after the work of English naturalist Henry Williamson, author of *Salar the Salmon* and *Tarka the Otter* (Lear, *Witness* 90).
To ensure scientific accuracy, Carson enlisted the expertise of oceanographer and ornithologist William Beebe*, a colleague of van Loon's, to provide feedback on her manuscript for *Under the Sea-Wind*. While working on chapters to submit to Howe, Carson continued her duties for the U.S. Fish and Wildlife Service as well as writing a monthly feature on fish and wildlife for the Baltimore *Sun*. In 1939, Higgins recommended that Carson be promoted to assistant aquatic biologist. Despite not receiving approval for this promotion until 1942, Carson assumed the duties of her new position and was transferred to a field laboratory in College Park, Maryland, where she became personal research and reference assistant to Robert Nesbit. Her job was to take his lab and field reports and verify, reference, and rewrite the information he compiled. In addition to this task, Carson wrote descriptive and historical text for a series of brochures intended for the general public entitled “Our Aquatic Food Animals” (Lear, *Witness* 95).


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*Charles William Beebe (1877-1962) had a long distinguished career as a naturalist and is best known for developing, with Otis Barton, the Bathysphere, which made deep sea diving possible for the first time in history. Beebe aided Carson’s first ocean dive off the coast of Florida and helped her obtain the Eugene F. Saxton Memorial Fellowship which supported her writing of *The Sea Around Us*. His publication, *The Book of Naturalists: An Anthology of the Best Natural History*, begins with Aristotle and ends with Carson’s essay on eels.
Literature “remarking on its lyrical beauty and its faultless science.” Wildlife and wilderness expert Howard Zahniser praised the book in *Nature Magazine* and Elmer Higgins “gave the book a superb review in *The Progressive Fish-Culturist*.” In spite of all the accolades, the first edition of *Under the Sea-Wind* was a commercial failure. One month after the book was published, Pearl Harbor was bombed and the nation’s attention turned to war. Just under 2,000 copies of the book sold, and when it went out of print in 1946, Carson had earned a paltry $689.17 in royalties. She vowed to never again rely on income from writing books. (Lear, *Witness* 105)

When Carson’s promotion to assistant aquatic biologist became official in 1942, her job duties basically stayed the same—writing and editing reports and other documents for Fisheries. She did, however, become editor of the *Progressive Fish-Culturist*, a trade magazine read by 3,500 biologists, fishery administrators, and marine biologists. While in this position, Carson wrote four U.S. Government Conservation Bulletins in a new public information series entitled “Food from the Sea” (Lear, *Witness* 108). The bulletins were substantial, numbering up to seventy-five pages in length. They were intended to educate the American housewife on the value of seafood as a substitute for wartime-rationed meats and poultry.

In 1943 a position in the Office of the Coordinator of Fisheries in Washington, D.C., became available. Carson applied and was hired for the job by Higgins, who immediately promoted her to associate aquatic biologist. About the same time, her temporary wartime office in Chicago was disbanded and Carson, Higgins, and another scientists relocated to Washington, while Carson and her mother returned to a home in
Maryland. In all Carson’s moves from place to place, Maria Carson remained by her daughter’s side. She was more than a constant companion and dependent member of the family; Maria maintained the household and cooked the meals, which was a great benefit to Carson, allowing her precious time to conduct research and write. Maria performed clerical tasks as well, even typing the entire final manuscript of *Under the Sea-Wind*. Shortly after her 1942 promotion, Carson was again promoted to aquatic biologist and shortly thereafter held the title of information specialist.

The promotions Rachel Carson received while employed as a government scientist were of great personal significance to her as well as historically important to other female scientists trying to succeed in a male-dominated field. Carson’s mentor, Mary Scott Skinker, was passed up for promotions time and again, and eventually fell victim to the prevailing attitude of the day that women do not belong in scientific professions, especially in highly-competitive research and field studies. After losing numerous promotion opportunities and being continually taunted as an “old maid,” Skinker was gradually worn down. She was forced to leave her government job and take a position as director of a small private residence for women.

Lear writes that during the 1930s and ’40s, careers in science for women “proceeded at a snail’s pace compared to their male counterparts” (*Witness* 97). Carson, however, was able to rise through the ranks because “she was exceptionally lucky in supervisors who recognized her talents” (*Witness* 97). The fact that she was working in public information and editing and not competing directly with men for prestigious academic appointments or research assignments also spared her the sexual harassment and
obstacles to advancement frequently experienced by other ambitious scientists who happened to be female.

By the time Carson was promoted to information specialist for the newly-named U.S. Fish and Wildlife Service, she had become quite adept at turning government research documents into popular natural history features for newspapers. Some of Carson’s best work was composed during this period and was recently compiled by biographer Linda Lear in a book entitled *Lost Woods: The Discovered Writing of Rachel Carson* (1998, Beacon Press, Boston). The book includes selected “discovered” writings such as field notes and speeches, a representative array of essays and articles, letters and film scripts, and excerpts from her published work. Much of the material from which Carson drew subject matter for her early natural history articles and essays originated in the classified government research reports that passed across her desk for editing. For instance, Carson wrote about the ability of bats to navigate with radar in a *Collier’s* article called “The Bat Knew it First.” In a 1945 article entitled “Sky Dwellers” published by *Coronet*, she wrote about the chimney swift, a bird whose nesting habits and migration patterns had puzzled biologists for years. (Lear, *Lost Woods* 113) By this time, it was second nature for Carson to take a fascinating new study and develop it into an essay that would both inform and delight the reading public.

In her job as information specialist, Carson was in contact with other division scientists who managed and monitored pest and predator controls. When the first test results of a new, classified pesticide—dichloro-diphenyl-trichloroethane, known as DDT—came to the attention of the fisheries division, she and her colleagues discussed and
debated this new chemical. They were alarmed by the early reports of DDT’s potent toxicity and news that the pesticide was being readied for manufacture and marketing to the general public. Using these classified government reports, Higgins collaborated with another biologist to assess the pesticide’s impact on fish and wildlife. And since Carson read and edited these documents as part of her job, she became familiar with all the available information on DDT. As early as 1945 Carson sent a query to Reader’s Digest to write an article about the pesticide. She wrote in her letter that the article would follow the progress of an experiment conducted by the Department of Fisheries to “show what other effects DDT may have if applied to wide areas: what it will do to insects that are beneficial or even essential; how it may affect waterfowl, or birds that depend on insect food; whether it may upset the whole delicate balance of nature if unwisely used” (Brooks, House 229). The magazine apparently turned down the idea.

Reader’s Digest may not have been interested in the subject of pesticides, but other media did address the issue early on. In 1945, both Harper’s Magazine and the Atlantic Monthly published articles by respected scientists concerning the potential of DDT to upset the balance of nature (Brooks, House 230). The outspoken editor of Nature Magazine, Edwin Way Teale, expressed alarm about DDT’s possible detriment to wildlife. And, while generally supportive of the claims that DDT was safe, Time magazine referred to the pesticide as “a two-edged sword” (Lear, Witness 119).** The similar objectives of a pesticide like DDT and a weapon like the atomic bomb to wipe out

** After the publication of Silent Spring, Time Magazine would join several other popular magazines attacking Carson for her exposé of the pesticide industry.
undesirable enemies was celebrated rather than questioned in other media such as *Popular Mechanics* and *Science News Letter*, which enthusiastically promoted the pesticide (Lear, *Witness* 120). Sensing this was not the right time to explore the subject of pesticides and intrigued by new oceanographic research that passed across her desk, Carson instead began investigating and studying material for her second book about the sea.

Since her first summer at Woods Hole in 1929, Carson began collecting reports and other research on marine biology and oceanography, but her job at Fish and Wildlife had been too demanding to allow her any time to write. In addition to managing the department library and its staff, Carson now supervised six staff in what she called “a small publishing house.” She also wrote speeches and congressional testimony for officials and other Fish and Wildlife personnel (Lear, *Witness* 131), a skill which came in handy when she was later invited to give keynote speeches and to testify before Congress. Her book about the ocean would have to wait a little while longer.

In the interim, Carson initiated a project more creatively suited to her writing interests—a series of twelve booklets for the general public describing the newly-established national wildlife refuge system. In 1946, as assistant editor for the Division of Information, Carson introduced and designed a plan for a guide series called “Conservation in Action,” which, in addition to serving as guides to the refuges, also provided a “forum for public education in ecology” (Lear, *Lost Woods* 41). To prepare for the guides she authored, Carson and friend and artist collaborator Kay Howe visited Chincoteague, Virginia, and the waterfowl refuge at the southern end of Assateague Island; Parker River Migratory Bird Refuge in coastal northern Massachusetts; and
Mattamuskeet, Pea Island, and Swanquarter off Pamlico Sound, North Carolina. In 1947, for a guide called “Guarding our Wildlife Resources,” the women visited the Bear River Migratory Bird Refuge near Salt Lake City, Montana’s Red Rock Lakes and the National Bison Refuge, as well as salmon fish hatcheries along the Columbia River.

Carson wrote or co-wrote five of the twelve booklets in the “Conservation in Action” series, which according to Lear, are still considered examples of fine nature writing by the U.S. Fish and Wildlife Service: “They were remarkable most of all for the way in which Carson introduced the role ecology played in the cycles and rhythms of nature and the interaction between natural habitat and requirements of wildlife” (Lost Woods 145). The project not only gave Carson a writing assignment she could embrace with heart and mind, it also gave her the opportunity to see more of the natural world west of the Mississippi as well as the Pacific Ocean.

In 1949 Carson inherited the position of chief editor when the former editor of the Division was promoted to head the Bureau of Fisheries. Throughout her tenure at the U.S. Fish and Wildlife Service Carson steadily compiled research and data on the ocean, adding to the material she had been saving since that first summer at Woods Hole. By 1950, as if to augment the data she had been collecting, Carson also cultivated a network of friends and colleagues who supported her research. Along with prominent scientists such as Henry Bigelow and William Beebe, Carson developed friendships with naturalists and nature writers such as Hendrik van Loon, Ada Govan, Edwin Way Teale, Louis Halle, Henry Beston, Irston Barnes, and Roger Tory Peterson. A long-time member of the Audubon Society, Carson was elected in 1948 to serve on the Society’s board of
directors. These personal and professional connections in the scientific and naturalist community provided a strong core of support from important people who knew and respected her work.

In addition to these colleagues, Carson benefitted from the services of her first literary agent, Mary Rodell, who became one of many important women in Carson’s professional life. Rodell began working for Carson just prior to Mary Scott Skinker’s death from cancer and filled, to some degree, an emotional void caused by the loss of her good friend and colleague. Rodell was a valiant and dedicated agent largely responsible for furthering Carson’s literary career, starting in the late 1940s when Carson was writing *The Sea Around Us*. Lear writes that “Rodell’s patience, forbearance, and integrity won Carson’s loyalty and affection. It is hard to imagine anyone else whom Carson would have trusted with her literary career” (*Witness* 155). Among many other accomplishments, Rodell was instrumental in arranging the serialization of *The Sea Around Us* in *The New Yorker* and acquiring the book contract with Oxford University Press.

While waiting for Oxford to print *The Sea Around Us*, Carson had several other writing projects before her. She had been in negotiation with Paul Brooks, an editor at Houghton Mifflin, who wanted her to write a guide to seashore life. Carson also wanted to reprint *Under the Sea-Wind* with a new publisher as soon as *The Sea Around Us* was released. Needing financial assistance for her upcoming projects and aware of the beneficial publicity that could come from winning a fellowship or writing contest, Carson wrote and submitted an essay entitled “The Birth of an Island,” published in the September
1950 issue of *The Yale Review*. The following December, Carson received word that she had won the $1,000 essay award given by the Westinghouse Prize Committee.

In 1951, the publication of *The Sea Around Us* propelled Carson to literary stardom. Rodell had done her job well. Readers discovered Carson via the pages of *The New Yorker* and as a featured author in the Book-of-the-Month Club. The book received widespread critical acclaim and remained on the *New York Times* bestseller list for eighty-six weeks (a record for nonfiction titles at the time). *The Sea Around Us* was translated into over 30 languages and was awarded many honors, including the National Book Award for Nonfiction in 1952, the John Burroughs Medal, and gold medals from the Geographical Society of Philadelphia and New York Zoological Society. A poll of the Associated Press' women editors named Carson “Woman of the Year in Literature” for 1951, and she was offered numerous honorary memberships in scientific and literary organizations such as the National Institute of Arts and Letters and the Royal Society of Literature. Carson's new fame as a writer of popular science also led to a prestigious Guggenheim Fellowship in 1951. Soon after *The Sea Around Us* was published, *Under the Sea-Wind* was re-issued by Oxford University Press and it, too, became a critically-acclaimed bestseller.

*The Sea Around Us* was a paramount achievement that attested equally to the author’s command of the English language and her brilliant scientific mind. Carson told a journalist who asked what she hoped the book would accomplish that “she wanted people to appreciate the sea,” but readers and critics were most impressed with her ability to “master such comprehensive information and to present a balanced picture with such lean
yet poetic language” (qtd. in Lear, *Witness* 202). Certainly, this was the vehicle upon which she guided people to know and appreciate the ocean better. The jacket “blurb” even attests to the poetic quality of *The Sea Around Us*, remarking: “Miss Carson has poetically presented this absorbing story to give the reader the impression of the vastness of her subject, not just as to size, but as to the scope of the forces that operate in the sea and the phenomena that characterize it.” Neither the depth of the vast ocean nor the eternal vastness of time and space daunted Carson, as exemplified in her opening chapter beginning with a quote from Genesis: “And the earth was without form, and void; and darkness was upon the face of the deep.” Almost a prologue, the first paragraph introduces the author’s tone and intended purpose of the book:

Beginnings are apt to be shadowy, and so it is with the beginnings of that great mother of life, the sea. Many people have debated how and when the earth got its ocean, and it is not surprising that their explanations do not always agree. For the plain and inescapable truth is that no one was there to see, and in the absence of eyewitness accounts there is bound to be a certain amount of disagreement. So if I tell here the story of how the young planet Earth acquired an ocean, it must be a story pieced together from many sources and containing whole chapters the details of which we can only imagine. The story is founded on the testimony of the earth’s most ancient rocks, which were young when the earth was young; on other evidence written on the face of the earth’s satellite, the moon; and on hints contained in the history of the sun and the whole universe of star-filled space. For although no man was there to witness this cosmic birth, the stars and the moon and the rocks were there, and, indeed, had much to do with the fact that there is an ocean (3-4).

By the end of 1951, over 250,000 copies of *The Sea Around Us* had been sold. In addition to two other prestigious awards—the Henry Grier Bryant Gold Medal for distinguished services to geography from the Geographical Society of Philadelphia and the Gold Medal
for contributions as an interpreter of the sea from the New York Zoological Society—
Carson was awarded four honorary doctorate degrees from the Drexel Institute of Technology, the Pennsylvania College for Women, Smith College, and Oberlin College.

The commercial success of *The Sea Around Us* finally allowed Carson a certain measure of financial security. In 1952, she left her job with the Fish and Wildlife Service and devoted all her time to writing. She had another book on the horizon, a guidebook that would describe shoreline creatures and their habitats. Carson spent a great deal of time on the Atlantic coast observing the creatures she chose to document and describe in her next book, *The Edge of the Sea*. At the Woods Hole Marine Biological Laboratory, located on the southwestern end of Cape Cod in Massachusetts, she conducted more detailed research with the laboratory equipment and specimens available to her there. She also visited the Maine coast on numerous occasions where she surveyed shore life and did further research. After purchasing a piece of property on the coast of Maine and building a summer cottage, she had a beach-side research laboratory just a few steps from her door.

Unfortunately, Carson’s welcome respite from a demanding government job and other responsibilities was short-lived. Family problems continued to erode any spare time or energy she could spend on research and writing. By this time her two nieces, Marjorie and Virginia, lived in their own apartments, but Marjorie’s husband had apparently left her, she was pregnant, and her precarious health required frequent trips to the hospital. On February 18, 1952, Marjorie gave birth to a son, Roger Allen Christie. She returned to her apartment, but had no one to care for her since Virginia herself was recovering from
surgery. Marjorie’s care naturally fell to Carson, who was also looking after her mother at this time. To make matters worse, Carson’s own health was poor and she wore herself out many times before *The Edge of the Sea* was done. Whenever she could find the time and had the energy, Carson worked on the book, often writing late at night when the house was quiet. Trips to the Southport cottage by the sea also afforded her welcome opportunities to write.

No biography of Rachel Carson would be complete without mentioning the profound and mystical friendship she shared with Dorothy Freeman. In 1952, Carson began building a seaside cottage on the coast of Maine in Southport. Dorothy and Stan Freeman had a summer home adjacent to Carson’s plot, and when Dorothy learned the author of *A Sea Around Us* was going to live next door, she wrote a letter to her. Rachel and Dorothy met and their “intense and delighted interest in sea life” (Freeman xiii) quickly developed into a loving friendship. The two women also shared literary interests as Dorothy was a retired schoolteacher who enjoyed writing nature essays and prose. The eleven-year correspondence exchanged between Rachel and Dorothy, in their depth, breadth, and tenderness (about one thousand letters remain), provide a rare glimpse into Carson’s most intimate heart and mind.

Dorothy Freeman’s granddaughter, Martha Freeman, writes that “Rachel and Dorothy” met a few months after she was born (xiii), so she knew Carson throughout her childhood. Upon Dorothy’s death, Freeman was given the letters which she compiled in a book titled *Always, Rachel* (Beacon Press 1995). The correspondence between Carson and Freeman provides additional biographical insight from someone who intimately knew
Carson and experienced first-hand the remarkable quality of the friendship between her grandmother and Rachel.

Through these letters and other sources uncovered by Linda Lear in her biography, it becomes clear that Dorothy’s friendship was tremendously comforting to Carson, especially during times of great duress. Carson was grateful to her friend for understanding the burden of caring for an aging mother (Dorothy, too, was caring for her elderly mother), but Rachel most appreciated Dorothy for her compassion and understanding as one who also writes. In one, often-quoted letter written to Freeman, Carson says: “All I am certain of is this: that it is quite necessary for me to know that there is someone who is deeply devoted to me as a person, and who also has the capacity and the depth of understanding to share, vicariously, the sometimes crushing burden of creative effort” (Lear, Witness 254).

In 1955, when The Edge of the Sea was published, it also made the New York Times bestseller list, but never attained the popularity or gained the attention of critics as did her previous two books. However, The Edge of the Sea is one of the most intimate and charming of all her books, despite its misleading “guidebook” design. Beautifully illustrated and divided into three parts, The Edge of the Sea focuses on the “three basic types” of seashores: “the rugged shores of rock, the sand beaches, and the coral reefs and all their associated features” (viii). In the preface, Carson explains what she attempts to do in the book:

Like the sea itself, the shore fascinates us who return to it, the place of our dim ancestral beginnings. In the recurrent rhythms of tides and surf and in the varied life of the tide lines there is the obvious attraction of movement
and change and beauty. There is also, I am convinced, a deeper fascination born of inner meaning and significance. . . . I have tried to interpret the shore in terms of that essential unity that binds life to the earth. In Chapter One, in a series of recollections of places that have stirred me deeply, I have expressed some of the thoughts and feelings that make the sea's edge, for me, a place of exceeding beauty and fascination (viii).

Carson's admission that she is integrating into the text that which "stirred" her emotionally is, for its time, unprecedented in a seaside guide. Along with identifying protozoa, arthropods, mollusks, and other shoreline creatures, Carson shares personal thoughts and feelings about the sensory and spiritual experience of being on the seashore, observing the richness and beauty of nature. In a sense, Carson indicates a willingness to "open up" to an established readership, a known audience who is less a mystery to her in the mid-1950s than in the mid-1940s, when she was still writing *The Sea Around Us*. The last paragraph in *The Edge of the Sea* is so eloquent and inclusive of the meaning carried through each of her ocean books, it reads like an epilogue for the trilogy as a whole:

Contemplating the teeming life of the shore, we have an uneasy sense of the communication of some universal truth that lies just beyond our grasp. What is the message signaled by the hordes of diatoms, flashing their microscopic lights in the night sea? What truth is expressed by the legions of the barnacles, whitening the rocks with their habitations, each small creature within finding the necessities of its existence in the sweep of the surf? And what is the meaning of so tiny a being as the transparent wisp of protoplasm that is a sea lace, existing for some reason inscrutable to us—a reason that demands its presence by the trillion amid the rocks and weeds of the shore? The meaning haunts and ever eludes us, and in its very pursuit we approach the ultimate mystery of Life itself (250).
Following *The Edge of the Sea*, Carson had planned to research and write about evolution and genetics, subjects which had long interested her. Reports of pesticide poisoning began increasing in the late 1950s, however, and Carson pursued the subject because no other writers were willing or able to do so. Much of the aerial spraying and ground treatment with DDT and other chlorinated hydrocarbon and organophosphate pesticides was being conducted under the auspices of the United States Department of Agriculture (USDA). Two separate incidents concerned her: The killing of birds after the aerial spraying of chemical pesticides above a bird sanctuary in Duxbury, Massachusetts, and a lawsuit to stop the aerial spraying of DDT on private property in Long Island. These and other reports of similar pesticide contamination convinced Carson she would have to abandon her other projects and focus on this difficult and controversial subject. Reluctant to take on the role of activist, especially given her increasingly unstable health, Carson nevertheless found herself charged with the task of exposing the severe and irreversible damage to biological life associated with the widespread and indiscriminate use of pesticides.

Almost since publication, *Silent Spring* has been a classic in the canon of literature about nature and the environment. Two events that had shaken the public’s trust in science and technology had occurred prior to the publication of *Silent Spring* in 1962—the bombing of Hiroshima and Nagasaki (leading to fear of radioactive fallout from atomic weapons) and news of the horrific birth defects caused by thalidomide, a drug administered to pregnant women (Lear, *Witness* 411-412). Calling for an urgent reassessment of the environmental and public health dangers of indiscriminate pesticide
use, *Silent Spring* explains how living organisms function and then clearly describes how and why these man-made chemicals are designed to inhibit or destroy the supporting structures of biological life.

In June of 1961, *The New Yorker* published the first of two excerpts from the book-in-progress, generating a flurry of attacks from the chemical industry. Attempts by industry representatives to coerce Houghton Mifflin to halt publication of *Silent Spring* were in vain. Instead, *Silent Spring*’s preliminary exposure in *The New Yorker* brought accolades to the respected biologist/writer for revealing the truth and asking important questions about pesticides (Lear, *Witness* 401, 408-409). Carson remained vigilant despite the onslaught of public assaults on her character. Confident that the facts were sufficiently documented in fifty pages of sources, she saw no need to debate her adversaries. As often happens with controversy, the ruckus caused by an angry and threatened chemical industry actually stimulated interest in the book rather than squelched its commercial success. In a pamphlet prepared by Houghton Mifflin to respond to the adverse criticism and inform booksellers and newspaper editors about the book, Carson wrote that a primary goal of the book, “to direct attention to a situation of which the general public was largely unaware, has been realized, perhaps because of, more than in spite of, the attacks” (Lear, *Witness*, 439).

*Silent Spring* became a bestseller, rising twice to the number one spot on the *New York Times* bestseller list. The first day it made number one was usually cause for celebration (as was the case with *The Sea Around Us* and *Under the Sea-Wind*), but Carson, who had been diagnosed with breast cancer about a year prior to the book’s
release, spent the day recovering from the side effects of radiation therapy instead.

Throughout the course of her illness, Carson shared the facts of her cancer with only a few close friends, often blaming her stiff walking on arthritis. In fact, the truth of the malignancy of an early breast tumor biopsy was actually withheld from her by doctors for almost a year, delaying surgery and other therapies that might have prolonged her life. In between radiation treatments, when she felt able to make public appearances, Carson accepted a few invitations to accept personally significant awards or to give high-profile interviews, including one for Eric Sevareid, who devoted an entire hour to the pesticide issue on CBS Reports.

Prior to the serialization of *Silent Spring* in *The New Yorker*, Carson was invited to speak or meet with organizations or government agencies on the subject of her upcoming book. She attended a luncheon given in her honor in the company of various influential women who, prior to the event, were each sent a proof copy of *Silent Spring*. The women she lunched with that day were members of Congress or the presidents of organizations such as the Children’s Bureau, League of Women Voters, National Federation of Women’s Clubs, National Council of Jewish Women, Garden Clubs of America, American Association of University Women, and the National Council of Women of the United States. Following this very successful meeting, Carson was invited to be the keynote speaker at the annual meeting of the National Council of Women and a luncheon for the American Association of University Women.

The White House Conference on Conservation, convened at President John Kennedy’s request by Interior Secretary Stuart Udall, was a critical factor in the eventual
impact of *Silent Spring* on public policy and federal legislation eventually passed to control the use of pesticides. Carson was invited as a distinguished guest to discuss her concerns about pesticides. Prior to the meeting, delegates were sent proof copies of *Silent Spring* as well as notices of the upcoming publication of chapters in *The New Yorker*. She also gave the commencement address at Scripps College and a speech to members of the Association of Librarians (Lear, *Witness* 405-407). Carson agreed to allow reporters to photograph and film her at her Maryland home for selected publicity pieces in *Life* Magazine and for the *CBS Reports* special. By the time of the official publication date on September 27, 1962, reviews of *Silent Spring* were already appearing in major national newspapers and magazines (Lear, *Witness* 422).

When *Silent Spring* was finally published, Carson was showered with praise; and, as expected, the chemical industry increased their personal attacks, calling her “hysterical,” questioning her professional credentials, and asking why an unmarried, childless woman should care about future generations. She responded to the negative press with unstinting dignity and a little “wicked humor.” In a speech given to the Women’s Press Club, Carson joked:

> My text this afternoon is taken from the *Globe* Times of Bethhehm, Pa. After describing in detail the adverse reactions to *Silent Spring* by the farm bureaus in two Pennsylvania counties, the reporter continued: “No one in either county farm office who was talked to today had read the book, but all disapproved of it heartily.”

While television cameras covered her speech, Carson commented on the tactics of a threatened industry, charging “that basic scientific truths were being compromised ‘to serve the gods of profit and production’” (qtd. in Lear, *Witness* 426). When word got out
that CBS Reports was preparing to broadcast their special report, "The Silent Spring of Rachel Carson," sponsors affiliated with the chemical industry pulled their commercials from the show. CBS aired the program anyway.

Carson was pleasantly surprised by the overall tone of the television program which portrayed her as a knowledgeable scientist with integrity and reasonable cause for concern. An estimated 10 to 15 million viewers watched the show, many of whom had likely been confused by the controversy over the highly-publicized book. The program concluded with this statement from Carson:

We still talk in terms of conquest. We still haven't become mature enough to think of ourselves as only a very tiny part of a vast and incredible universe. Now I truly believe that we in this generation must come to terms with nature, and I think we're challenged, as mankind has never been challenged before, to prove our maturity and our mastery, not of nature but of ourselves (qtd. in Lear, Witness 450).

A few days after the broadcast Senator Abraham Ribicoff, a Democrat from Connecticut, called a congressional review of environmental hazards. Carson accepted an invitation to testify on pesticides before his committee. Two bills to protect wildlife were before Congress at the time. Following the committee meetings, a report was published by the President's Science Advisory Committee (PSAC) recommending "increased public education on the benefits and hazards of pesticides use, noting that 'until the publication of Silent Spring, people were generally unaware of the toxicity of pesticides'" (Lear, Witness 451). The PSAC report served not only to heighten awareness of the issue, it vindicated Carson of the charges by her attackers and reassured a public confused by the controversy. Frank Graham writes in After Silent Spring that by the end of 1962, over 40
bills regulating pesticide use had been introduced in state legislatures (72). In 1973, Congress passed legislation banning the use of DDT in the United States.

After a four-year battle with breast cancer, Rachel Carson died on April 14, 1964. Knowing she was dying, Carson had expressed relief to friends that she could see *Silent Spring* through publication and its exciting and inspiring outcome. She was glad that her last book, despite its bleak subject, had touched a chord in people around the world. Even so, ecologist and writer Sandra Steingraber writes that Rachel Carson “did not go gently or gratefully into any good night” (21). In the pinnacle of her career, Carson knew she might not live to do all the things she yearned to do. Even as she was preparing her will and deciding where to place her papers in permanent repository, Carson laid out her hope for the future. She shared with friends and colleagues her desire to establish a citizen’s advisory committee and an organization that would carry on the work begun by *Silent Spring*. Her book had taken on a life of its own and she wanted to ensure that the momentum building from its success would continue. Her concern lay in finding ways to organize and distribute pesticide information to the public. She believed citizens had the right to know what chemicals were being manufactured and released into the environment, and they had the right to ask questions and receive complete and honest answers about the health and environmental consequences of pesticide use.

Could Rachel Carson have possibly imagined that by the end of the twentieth century she would come to be known as the founder of the modern environmental movement? Considered by many environmental activists as their “patron saint,” Carson continues to be a source of inspiration. The spirit and determination which fueled her
work as an author and ecologist continues to distinguish Rachel Carson as the remarkable
woman who launched a movement of conscience and action. Her mission began as a
writer of nature literature, as self-appointed biographer of the sea, as witness for nature,
and lives on in the words she shared with others:

The pleasures, the values of contact with the natural world, are not
reserved for the scientists. They are available to anyone who will place
himself under the influence of a lonely mountain top—or the sea—or the
stillness of a forest; or who will stop to think about so small a thing as the
mystery of a growing seed (qtd. in Lear, *Lost Woods* 160).

Eight years after Rachel Carson’s death in 1964, a newspaper editorial declared:

“A few thousand words from her and the world took a new direction” (Brooks, 1980,
276). While *Silent Spring* was one of the most influential and important books of the
twentieth century, it never would have been such a powerful force if not for the immense
popularity of her more rhapsodic writing about the sea. In the next section of this thesis, I
take an ecocritical look at Rachel Carson’s literary aesthetic, where I explore the
influences that created her particular style of writing and her multi-lensed, ecological, and
mystical approach to the experience, observation, and creation of her art.
Poem #668 (c. 1863)

“Nature” is what we see –
The Hill – the Afternoon –
Squirrel – Eclipse – the Bumble bee –
Nay – Nature is Heaven –
Nature is what we hear –
The Bobolink – the Sea –
Thunder – the Cricket –
Nay – Nature is Harmony –
Nature is what we know –
Yet have no art to say –
So impotent Our Wisdom is
To her Simplicity.

-- Emily Dickinson
PART TWO

Re-enchanting Science:
Carson’s Literary Aesthetic

\emph{Nature is what we know –}
\emph{Yet have no art to say –}
(Emily Dickinson)

Nature writing often combines a scientific knowledge of nature with a desire to re-enchant science, to connect scientific knowledge to a spiritual sense of nature and its beauty. Thus, nature writing often uses conventions and forms more characteristic of poetic discourse and appeals to pathos as well as to reason (Herndl and Brown, eds. \textit{Green Culture: Environmental Rhetoric in Contemporary America}).

If Emily Dickinson thought that “nature is what we know, yet have no art to say,” it is only because she lived a century too soon to read the lyrical expositions of natural science penned by Rachel Carson. If need be, I would argue that Carson “had the art” to write evocatively about the natural world and that Dickinson, if she had had the chance, would have found in Carson a kindred spirit. Dickinson also reprehends what she witnessed as a growing disassociation of human beings from nature. In another poem she writes: “I pull a flower from the woods— / A monster with a glass / Computes the stamens in a breath— / And has her in a ‘class’!” (36). Like Dickinson, Carson gently admonished scientific practices that over-emphasized detachment from the natural world. Carson was a dedicated marine biologist. She spent countless hours studying zoology, memorizing taxonomy, and recording species classifications. What set Carson apart from others in her profession was her sense that something was missing—that if scientists are to
truly know and understand the world around them, they must adopt an ecological point of view which meant getting out of the laboratory and into the field. Only then would their findings be meaningful, and hopefully, regarded with more respect and appreciation.

Carson collaborated with dozens of naturalists, biologists, and other scientists who shared her ecological philosophy and contributed to the development of a new branch of biological study: ecology. As a nature writer and ecologist, Carson functioned as an articulate and knowledgeable liaison between scientists and lay people. She accomplishes this, as Herndl and Brown write, using “the conventions and forms more characteristic of poetic discourse and appeals to pathos as well as to reason” (12), thus bringing an ecological sensibility to her practice of writing as well as her practice of science.

A literary tapestry of poetry, pathos, reason, and fact underlies all of Carson’s writing—it is her compositional art, her ecological sensibility, her literary aesthetic. There is a delicate, but dynamic, equanimity between the senses, the soul, and the intellect in Carson’s approach to nature as recorder of what she observes, feels, knows, and experiences. Without reservation and true to heart, Carson writes about the natural world with a poet’s sensitivity, “re-enchanting” science by elucidating the literal with figurative language—sensory particulars, imagery, metaphors, similes, and allusion.

It is interesting that Herndl and Brown say that nature writers “re-enchant” science, because it leads us to wonder when science was ever enchanted and why re-enchanting science is a necessary vocation of nature writers at all. According to science historian Carolyn Merchant, nature was thought of as an organism before the mechanistic world of Descartes and Newton took over:
for sixteenth-century Europeans the root metaphor binding together the self, society, and the cosmos was that of an organism. As a projection of the way people experienced daily life, organismic theory emphasized interdependence among the parts of the human body, subordination of individual to communal purposes in family, community, and state, and vital life permeated the cosmos to the lowliest stone (1).

The Scientific Revolution mechanized and rationalized the world view, and nature was thought of as something disorderly that needed to be brought under control. “Two new ideas, those of mechanism and of the domination and mastery of nature, became core concepts of the modern world” (2). In what could be considered the first wave of scientific re-enchantment, the eighteenth and early-nineteenth centuries found people turning again to nature for spiritual sustenance and exultation during the Romantic Period. However, with the rapid expansion of industrial and technological innovations in the late-nineteenth and early-twentieth centuries, economic interests have now taken control of decisions affecting the biosphere, leading to serious environmental damage and concerns for the future of the planet.

Rachel Carson witnessed many serious threats to the natural world and the environment in which humans live. By re-enchanting science through her writing, Carson hoped to raise nature literacy among those estranged from the natural world by an increasingly technological world. Almost forty years after the publication of Silent Spring, Carson’s writing is still illuminating and relevant. Some of her lesser known work was recently published by The Orion Society, an organization which produces a quarterly journal devoted to increasing nature literacy. According to the Society, Orion Magazine has been called “the literary, artistic, and philosophic voice of the environmental
movement.” In the introduction to a special feature on science in the Spring 1999 issue, the editor writes:

But as much as science helps us, informs us, and challenges our imagination, its statistics, facts, and theories alone cannot tell us how to live. They are not meant to do so. The qualities that inspire much human behavior, that allow us to feel empathy and compassion, that inspire intuitive understanding (and hatred and fear, for that matter) elude the quantitative analysis upon which science often relies. We are motivated and informed by truths that cannot be reduced to numbers, and when we allow the numbers to make choices for us, things go wrong (17).

At the end of the introduction, a question is asked: “How will we put soul back into the way we understand the world?” In a magazine devoted to ecoliterature, the answer might be that a certain kind of “re-enchantment” is required, supplied by reading and writing about nature, environment, and place. Carson’s writing appeals precisely because she, like other nature writers, has put the soul back into the experience of nature. Carson re-enchanted science and sparked an ecological movement which brought back the concept of nature as an organism; as something which contains a vital life force that flows through all living plants and animals as well as rocks, soil, pebbles, and sand. So, when we say that nature writers endeavor to re-enchant science with poetry, we are simply saying that they generally want humanity to return to a holistic appreciation for nature, not as a commodity or a resource or an economic concern, but valued simply for its intrinsic worth.

Carson re-enchanted science in many ways, intertextuality being one of them. Commonly found in literature, the practice of alluding to other disciplines and texts, and recognizing the multiplicity of word meanings and origins, is less common in scientific texts, which, if it exists at all, seldom ventures beyond the borders of scientific inquiry. As
a kind of literary ecology, intertextuality recognizes the interdependence and fluidity of language and emphasizes the connections to other forms of discourse that, synergistically, create new meaning, ideas, images, and sensations. Carson’s literary aesthetic was informed and inspired by her experience of certain kinds of literature, especially “the rich scientific literature of the sea” (qtd. in Lear, *Lost Woods* 148-149).

In a speech to members of the Sorority of Women Journalists, Carson said she “loved Swinburne and Masefield and all the other great sea poets.” And she uses the following lines from a poem by Emily Dickinson to explain her lifelong fascination and long-awaited adult encounter with the sea:

> I never saw a moor;  
> I never saw the sea;  
> Yet know I how the heather looks,  
> And what a wave must be (qtd. in Lear, *Lost Woods* 148-149).

Other writers known to have influenced Carson’s writing are Henry David Thoreau, Henry Beston (author of *The Outermost House*), and British naturalist Richard Jeffries, whose poetry so moved Carson she adopted one of his passages as her “creed”:

> The exceeding beauty of the earth, in her splendor of life, yields a new thought with every petal. The hours when the mind is absorbed by beauty are the only hours when we really live. All else is illusion, or mere endurance (qtd. in Lear, *Lost Woods* 147).

This, I think, is the philosophy at the core of Rachel Carson’s literary aesthetic. Guided by words reminding her that contemplation stimulates mindfulness, Carson hones her powers of perception and is open to an endless fascination with the natural world. A mind absorbed by beauty and stimulated by the senses is also affected by emotion. Carson believes emotion (as the recognition and receipt of joy) plays an important role in the
learning process. Addressing biologists in an introduction she wrote for a reference book sponsored by the National Council of the Teachers of English, Carson writes: “Biology deals with the living creatures of the living earth. Pleasure in color, form, and movement, awareness of the amazing diversity of life, and the enjoyment of natural beauty are part of man’s heritage as a living creature” (in Lear, _Lost Woods_ 165-166). To heighten these emotions, Carson stresses that actual experience in the field instead of time spent in the laboratory should be a prerogative of biologists:

> Our first conscious acquaintance with the subject should come, if possible, through nature—in fields and forests and on the shore; secondarily and by way of amplification and verification we should then explore its laboratory aspects. Some of the most gifted and imaginative biologists have first approached their subject through the medium of sensory impression and emotional response. The most memorable writings—though they be addressed to the intellect—are rooted in man’s emotional reaction to that life stream of which he is a part (in Lear _Lost Woods_ 165-166).

After the publication of _The Sea Around Us_, Carson was asked to speak at various functions, either as a keynote speaker or to accept one of the many awards the book had won. In her acceptance speech for the National Book Award, she responds to the surprise expressed by people that a “work of science should have a large popular sale.” Countering the idea that science is something separate from everyday life, Carson says:

> The materials of science are the materials of life itself. Science is part of the reality of living . . . . The aim of science is to discover and illuminate truth. And that, I take it, is the aim of literature, whether biography or history or fiction. It seems to me, then, that there can be no separate literature of science (in Lear, _Lost Woods_ 91).
Carson’s writing makes the critical connection between scientific knowledge and life experience. As both a scientist and a writer, she discovers and illuminates the truths found in nature. The sensation of being swept to another place and time, of “losing” oneself in the characters, of being enthralled to the point of revelation are the aesthetic qualities which mark Carson’s literary style.

Reading Carson’s ocean trilogy is a visit to the depths, a kind of virtual reality in which the reader is temporarily transported into a world uninhabited by humans. We shape-shift and metamorphosize into fish, shrimp, crab, and eel, experiencing their liquid world through tentacles and fins, marine eyes and ears, aquatic noses and tongues. The sky is ours to experience as well. In the following passage from *Under the Sea-Wind*, Carson gives us wings to experience the upsurge of plovers leaving the Arctic on their fall migration:

> About midnight the flight began. The first flock of some threescore birds rose into the air, circled over the plain, and straightening out into flight formation headed south and east. Another and another flock found its wings and hurtled after the leaders, flying low over the tundra that rolled like a deep purple sea beneath them. There was strength and grace and beauty in every stroke of the pointed wings; there was power without end for the journey (72).

In real time, narrative style Carson is free to use imagery in an omniscient voice declaring the grace and power of birds in flight. As author, Carson participates minimally in the text. She indulges herself only as nature’s scribe, preferring to be a voice for human conscience, wonder, and humility rather than a proud figure of authority. Carson writes in the “organic form,” which Samuel Taylor Coleridge describes in *Biographia Literaria* as
“innate; it shapes, as it develops, itself from within, and the fulness of its development is one and the same with the perfection of its outward form” (264). Recognizing the power of imagination in the writing process, Coleridge writes that the poet, “described in ideal perfection” is one who

diffuses a tone and spirit of unity, that blends, and (as it were) fuses, each into each, by that synthetic and magical power, to which we have exclusively appropriated the name of imagination. This power, first put in action by the will and understanding, . . . reveals itself in the balance or reconciliation of opposite or discordant qualities: of sameness, with difference; of the general, with the concrete; the idea, with the image; the individual, with the representative; the sense of novelty and freshness, with old and familiar objects, a more than usual state of emotion, with more than usual order; judgement ever awake and steady self-possession, with enthusiasm and feeling profound or vehement; and while it blends and harmonizes the natural and the artificial, still subordinates art to nature, the manner to the matter; and our admiration of the poet to our sympathy with the poetry” (248).

Coleridge perfectly exemplifies Carson’s application of organic unity in her ecologically-informed style of writing. Her imagination is actively engaged in taking abstract ideas and facts and reconciling what is discordant in one form by transforming it into a form more akin to poetry, which, as Coleridge states, is done through a process of balancing seemingly opposing qualities, such as “the general, with the concrete; the idea, with the image; a more than usual state of emotion, with more than usual order . . .” She harmonizes the natural (birds, fish, sand crabs) with the artificial (scientific nomenclature, the printed page), while at the same time subordinating the art(ificial) with the content of her work, the natural. The natural is more than the actual things living and being in the natural world; it is also human emotion and intellect that rises naturally out of our essential
human nature. Thus, through imagination, our vital connection to the world engages us in a spirit of unity and coalescence.

The freedom with which Carson eschews jargon and chooses to embrace a more lyrical style of writing seems inspired by Coleridge’s views on poetry and imagination. In a more contemporary anthology of literature, editor Michael Meyer defines organic form as “works whose formal characteristics are not rigidly predetermined but follow the movement of thought or emotion being expressed. . . . [They] grow like living organisms, following their own individual patterns rather than external fixed rules” such as those “governed by the sonnet” (1504). Likewise, Carson rejects most of the rules governing scientific writing, intuitively following the movement of thought or emotion which comes through intimate observation, as she explains in a letter to a friend:

The writer must never attempt to impose himself upon his subject. He must not try to mold it according to what he believes his readers or editors want to read. His initial task is to come to know his subject intimately, to understand its every aspect, to let it fill his mind. Then at some turning point the subject takes command and the true act of creation begins . . . The discipline of the writer is to learn to be still and listen to what his subject has to tell him” (qtd. in Brooks, *House* 2).

Again, just as biologists should first encounter their subject in the field rather than the laboratory, writers should trust that the creative process is best stimulated by careful attention, humility, and discipline. The subject or content of the text then determines the form the writing will take, rather than molding it to a preconceived standard. Carson thus communes with her subject and serves as a conduit through which a body of scientific knowledge can be shared with non-scientists who want to know, feel, experience, and
appreciate the world in which they live. Coleridge also wrote that, in essence, content determines form:

The artist must imitate that which is within the thing, that which is active through form and figure and discourses to us by symbols—the Natur-geist, or spirit of nature . . . . The idea which puts the form together cannot itself be the form. It is above form, and is its essence, the universal in the individual, or the individuality itself,—the glance and the exponent of the indwelling power (269).

Carson was driven by ideas, they were her “indwelling power” and influenced her literary aesthetic or form of writing. Essentially, the thing “which is active through form and figure”—the ebb and flow of the tides, the migration pattern of eels, the nesting habits of sanderlings—is portrayed as a vital presence interacting on the planet in the ecosystem, but also in the human psyche, soul, and intellect.

It certainly appears, that in Carson’s rejection of the pedantic technical jargon of her peers, she finds a new use for language that awakens consciousness and arouses the spirit. In her acceptance speech for the National Book Award for Nonfiction for *The Sea Around Us*, Carson explains further how content determines form:

My own guiding purpose was to portray the subject of my sea profile with fidelity and understanding. All else was secondary. I did not stop to consider whether I was doing it scientifically or poetically; I was writing as the subject demanded. 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 (in Lear, *Lost Woods* 91).
Without stopping to consider whether she was writing scientifically or poetically Carson did both, intuitively weaving the two genres together. This is not to say that her writing never took on a scholarly tone or the content was never laden with facts. But in scouring the pages of *Silent Spring*, it was difficult to find many passages where the science can be isolated from the poetry. For example, randomly opening *The Sea Around Us*, I begin reading about the effects of “winds lashing the sea into great waves” which travel across the sea and are transformed into “undulations” known as “ground swell” (131). Carson describes areas across the globe—from the Atlantic to the Mediterranean to the Arctic seas—where tremendous waves have been recorded along with the shipwrecks that resulted. Even waves that originate in the deep sea are a force to reckon with:

> It is always the unseen that most deeply stirs our imagination, and so it is with waves. The largest and most awe-inspiring waves of the ocean are invisible; they move on their mysterious courses far down in the hidden depths of the sea, rolling ponderously and unceasingly. For many years it was known that the vessels of Arctic expeditions often became almost trapped and made headway only with great difficulty in what was called “dead water”—now recognized as internal waves at the boundary between a thin surface layer of fresh water and the underlying salt water (132-133).

Figurative language describes the literal and we almost bodily feel the immense expanse of sea water “rolling ponderously and unceasingly,” while learning something new and fascinating about the physical properties of a wave. Ocean currents also command a good deal of attention in *The Sea Around Us*, as in the following passage:

> The permanent currents of the ocean are, in a way, the most majestic of her phenomena. Reflecting upon them, our minds are at once taken out from the earth so that we can regard, as from another planet, the spinning of the globe, the winds that deeply trouble its surface or gently encompass it, and
the influence of the sun and the moon. For all these cosmic forces are closely linked with the great currents of the ocean, earning for them the adjective I like best of all those applied to them—the planetary currents (135).

In this chapter on currents that spiral around the globe, Carson takes us on a tour both geographical and historical, describing the movement of the earth’s water as it reacts to “the winds; the modifying influences of the sun, the revolving of the earth ever toward the east, and the obstructing masses of the continents” (135). Historical accounts of captains and other seafarers enliven the text with vivid narratives of events experienced at sea. Carson includes one recorded by Robert Cushman Murphy who witnessed a dramatic “upwelling” one night off the Columbian coast:

“On either side, and at a baffingly uncertain distance from the ship, a dark line, like a wall of advancing water, seemed to be closing in upon us . . . We could hear the splash and murmur of a troubled surface close by . . . Presently we could see a gleam of foam sprinkled with points of luminescence on the slowly approaching swell or head to the left . . . When the dark, white-outlined menace reached us, it proved to be nothing more than a field of the dancing water, tossing its little peaks a mere foot or so into the air and beating a tattoo on the steel flanks of “Askoy” . . . The surface was seething, boiling with life, much of which was de profundis. Larvae of clawless lobsters, tinted jellyfish, nurse chains of salps, small herring-like fishes, a silvery hatchetfish with its face bitten off, rudder fishes, hanging head downward, luminous lantern-fishes with shining light pores, red and purple swimming crabs, other creatures which we could not name at sight . . . A general holocaust was in progress. The little fishes were eating invertebrates or straining out the plankton; the squids were pursuing and capturing fish of various sizes; and the blackfish were no doubt enjoying the squids . . . ” (146).
For the lay person learning about ocean currents for the first time, or the oceanographer reading it for pleasure and new insight, Carson provides an educational as well as enchanting natural history in *The Sea Around Us*.

Carson is said by colleagues and critics to have a poet’s soul because she does what poets do: through language she illuminates the meaning of experience and ideas. To put this another way, French poet and philosopher Francis Ponge writes in *The Voice of Things* that “the function of poetry . . . is to nourish the spirit of man by giving him the cosmos to suckle” (109). Poetry is food for the soul and this source of nourishment comes from a universe of infinite possibilities. It is no coincidence that Carson’s writing is extolled for its poetic beauty as well as its spiritual focus. Poetry, after all, is sometimes thought to be divinely inspired. Truth, beauty, knowledge, wisdom, wonder, joy, and delight feed the mind, reaching us through metaphor, simile, syntax, and signs which make complex ideas, events, and sensations tangible. Carson’s unorthodox approach to science writing stems in part from her emphasis on the spiritual or mystical, conveyed eloquently through language that celebrates the wondrous virtues of the natural world. She makes direct references to or quotes the Bible and uses words such as “mysterious,” “celestial,” “miracle,” “firmament,” “heavens,” and “eternal.” Houghton Mifflin editor and friend, Paul Brooks, remembers that Carson was exceptionally attuned to nature:

Though she had the broad view of the ecologist who studies the infinitely complex web of relationships between living things and their environment, she did not concern herself exclusively with the great impersonal forces of nature. She felt a spiritual as well as physical closeness to the individual creatures about whom she wrote: a sense of identification that is an essential element in her literary style (*House 8*).
This spiritual sense of identification is revealed to Brooks on a visit to Carson’s summer cottage on the Maine coast. He and Carson spent an hour examining tiny sea worms, snails, hydroids, and green sponges collected from the tide pools outside her seaside laboratory. Finally finished with the specimens, Carson took up the pail, walked out to the rocks, and returned the living creatures to the sea. Summing up this experience, Brooks writes “This, I think, is what Albert Schweitzer (to whom Silent Spring is dedicated) meant by ‘reverence for life.’” (Brooks, House 8). In her speech to the Sorority of Women Journalists—as close as she came to writing a memoir—Carson talks personally and philosophically about the value of nature to spiritual growth.

I am not afraid of being thought a sentimentalist when I stand here tonight and tell you that I believe natural beauty has a necessary place in the spiritual development of any individual or any society. I believe that whenever we destroy beauty, or whenever we substitute something man-made and artificial for a natural feature of the earth, we have retarded some part of man’s spiritual growth.

I believe this affinity of the human spirit for the earth and its beauties is deeply and logically rooted. As human beings, we are part of the whole stream of life... Our origins are of the earth. And so there is in us a deeply seated response to the natural universe, which is part of our humanity (qtd. in Lear, Lost Woods 160).

This statement clearly shows an ecological philosophy that extends beyond the field, the tide pool, even the abyss, into Carson’s prose where science and spirit are reflected as parts of a whole, rather than disparate forces in opposition to one another.

In the book-by-book explication which follows, I include examples of Carson’s prose which illuminates, clarifies, and demystifies scientific knowledge, thus connecting it, and her readers, “to a spiritual sense of nature and its beauty.”
Under the Sea-Wind: A Naturalist’s Picture of Ocean Life

Despite being overshadowed by the best-selling The Sea Around Us and the controversial Silent Spring, Rachel Carson’s first book in her ocean trilogy, Under the Sea-Wind (1941, 1952) is considered by many to be her most engaging and creatively successful book. In Under the Sea-Wind, Carson vividly describes life in the salt marsh, river, and sea environments through the viewpoints of the birds, fish, and mammals who live there. Book I primarily follows a pair of sanderlings—Blackfoot and Silverbar—to their arctic nesting ground where they endure a devastating spring snowstorm, breed and raise their young. They leave the story as they fly south on the sixty thousand-mile trip to their winter home.

The life cycle of Scomber, a mackerel, is followed in Book II. Starting as a minuscule larvae, he is prey to tiny shellfish and anchovies; as he grows bigger, Scomber escapes from a six-foot rock cod, a conger eel, and most dangerous of all, the nets of fishermen. Book III focuses on Anguilla the eel, who has spent the first ten years of his life in an inland pond and then sets out on a dramatic two-hundred mile journey to the sea.

Using a third-person omniscient voice, Carson gives her reader the opportunity to experience life from the perspective of the many sea creatures who are chronicled in the story. The main characters—a pair of sanderlings, a young mackerel, an eel, black skimmer, mouse, snowy owl, lamprey, osprey, and bald eagle—are given names, not to personify them in the anthropomorphic sense, but to enable her reader to identify with each individual creature and their particular adventures. While this technique often lends itself to anthropomorphizing nonhuman characters, Carson is careful to avoid personifying
the animals and birds with human characteristics. In a memo to her publisher, Simon & Schuster, Carson writes that she wanted to avoid the “human bias” prevalent in popular books about the ocean:

The ocean is too big and vast and its forces are too mighty to be much affected by human activity. So I decided that the author as a person or a human observer should never enter the story, but that it should be told as a simple narrative of the lives of certain animals of the sea. As far as possible, I wanted my readers to feel that they were, for a time, actually living the lives of sea creatures (in Lear *Lost Woods* 56).

Carson credits this narrative technique to the English nature writer Henry Williamson, author of *Salar the Salmon*. In Williamson’s highly-acclaimed “adventure tale,” the reader follows Salar’s perilous journey from sea to river. Other named characters in his book include a porpoise, orca, seal, cannibal eel, and mullet fishermen. Like Carson, Williamson skillfully blends biological facts with vivid, poetically-rendered settings:

Salar lay where the moving fronds of weed stroked the azure-white skin of his belly. Within his body, and under the forepart of his backbone, was a cavity or air bladder which automatically adjusted itself to the lift of the water: thus he was able to continue floating a few inches above the stone, for the pleasing sensation of being touched by the seaweed (52).

*Under the Sea-Wind* faithfully emulates Williamson’s format, right down to the casting of the only humans as fishermen. Scomber, a mackerel, is one of the protagonists in *Under the Sea-Wind*. Borrowing from Williamson’s narrative style, Carson provides biological detail while lyrically describing Scomber’s hatching in the open sea:

He came into being as a tiny globule no larger than a poppy seed, drifting in the surface layers of pale-green water. The globule carried an amber
droplet of oil that served to keep it afloat and it carried also a gray particle of living matter so small that it could have been picked up on the point of a needle. In time this particle was to become Scomber, the mackerel, a powerful fish, streamlined after the manner of his kind, and a rover of the seas (113).

*Under the Sea-Wind* is also a little gem of botanical science along with the ecological adventures of fauna from ghost crabs to golden plovers to mackerel and polar foxes. Here, in a gently teasing voice, Carson portrays the end-of-summer transformation that befalls green plants:

Now the sun dipped farther below the horizon; the grayness of the nights deepened; the hours of twilight lengthened. The rains that came more often and lashed with sharper violence were matched by a gentler rain as the flowers of the tundra dropped their petals. The foodstuffs—the starches and fats—had been stored away in the seeds to nourish the precious embryos, into which had passed the immortal substance of the parent plants. The summer’s work was done. No more need of bright petals to lure the pollen-carrying bees; so cast them off. No more need of leaves spread to catch the sunshine and harness it to chlorophyll and air and water. Let the green pigments fade. Put on the reds and yellows, then let the leaves fall, too, and the stalks wither away. *Summer is dying* (68-69).

Samuel Taylor Coleridge describes beauty as “in the abstract, the unity of the manifold, the coalescence of the diverse; in the concrete, it is the union of the shapely with the vital . . . It may be present in a disagreeable object, in which the proportion of the parts constitutes a whole; it does not arise from association, as the agreeable does, but sometimes lies in the rupture of association . . .” Generally, nature is associated with beauty. We are enthralled by the resurgence of new and brilliant life each spring, the fecundity of nature through the summer, and lament the coming of winter, a bleak time. But beauty, according to Coleridge and Carson, is also found in that which ruptures the
association; in that which represents the power and vitality of life and the necessity of
death. In the following passage from Under the Sea-Wind Carson devotes a particularly
empathetic passage to an event concerning a band of squid. No creature, from squid to
lemming to eel, is considered too lowly or grotesque to be compassionately portrayed by
Carson. Reading the following excerpt, we are apt to become as mesmerized as the ill-
fated squids drawn to moonlight:

The sea, that gleamed with the moon’s lambent silver, drew to its surface
many squids, dazed and fascinated by the light. The squids drifted on the
sea, their eyes fixed on the moon. Gently they drew in water and expelled
it in jets, propelling themselves backward away from the light at which they
gazed. Moon-bewildered, their senses did not warn them that they were
drifting into dangerous shoals until the harsh grate of sand brought sharp
awakening. As they stranded, the hapless squids pumped water all the
harder, driving themselves out of even the thinning film, onto sand from
which all water had ebbed away (39).

In this nonfiction realistic drama of shore life, the squids have beached themselves and are
found dead the next morning, providing food for sanderlings, gulls, and other large birds.
Without value judgment, Carson describes the marvelous interdependence of living
organisms in the natural cycles of birth, life, and death.

**The Sea Around Us**

Despite the vastness and complexity of its subject, The Sea Around Us (1951) was
Carson’s first commercially successful book, lasting eighty-six weeks on the New York
Times bestseller list (a record for nonfiction books listed by the Times). A “biography” of
the ocean, The Sea Around Us comprises detailed information on evolutionary and
geologic history, myths and legends, advances in technology, fluctuations in oceanic and atmospheric temperatures, and new biological data gathered by the government during World War II. The word “ecology” does not appear in the index, but ecological principles are present throughout the book. In his essay, “A Taxonomy of Nature,” Thomas J. Lyon writes that in *The Sea Around Us* Carson “arranged the facts of oceanography and marine biology tellingly, so that the drama and interplay of forces pointed inescapably toward a holistic, ecological view of nature” (277). For instance:

> With these surface waters, through a series of delicately adjusted, interlocking relationships, the life of all the parts of the sea is linked. What happens to a diatom in the upper, sunlit strata of the sea may well determine what happens to a cod lying on a ledge of some rocky canyon a hundred fathoms below, or to a bed of multicolored, gorgeously plumed seaworms carpeting an underlying shoal, or to a prawn creeping over the soft oozes of the sea floor in the blackness of mile-deep water (Carson, *The Sea Around Us* 19).

Carson quotes *Genesis* on the first page of the book, emphasizing the very beginning of conceptional time, at least in Biblical terms. A recurring motif in Carson’s writing, the long expanse of geologic time had a comforting effect on people. Troubled by problems in the world and losing “faith in man,” Carson’s readers wrote to say they found it reassuring to read about the ancient history of the earth; and to gain a sense of antiquity and permanence amidst a rapidly changing technological world (Lear, *Lost Woods* 96).

Using a less fanciful approach than in *Under the Sea-Wind*, Carson’s narrative in *The Sea Around Us* is still enthralling creative nonfiction. In the following excerpt from the chapter “The Long Snowfall,” Carson brings to light one of her most enchanting revelations: the “steady, unremitting, downward drift of materials from above, flake upon
flake, layer upon layer—a drift that has continued for hundreds of millions of years, that will go on for as long as there are seas and continents" (74). These sediments, Carson writes, “are a sort of epic poem of the earth. . . . For all is written here” (75). New methods for sampling and studying the composition of the ocean floor have yielded exciting new information about the history of the earth and the complexity of life in the sea. Carson uses more biological terms and Latin taxonomy in The Sea Around Us than in her previous writings, as she describes one-celled creatures, foraminifera and radiolaria, whose remains contribute to the “sediment carpet” or “ooze” covering the ocean floor:

Over great areas of the temperate oceans the sea floor is largely covered with the remains of unicellular creatures known as foraminifera, of which the most abundant genus is Globigerina. . . . But always they have been simple animals, living in an intricately sculptured shell of carbonate of lime, the whole so small you would need a microscope to see the details. . . . In warm, lime-rich seas these tiny creatures have always multiplied prodigiously, and so, although each is so minute, their innumerable shells blanket millions of square miles of ocean bottom, and to a depth of thousands of feet.

. . . . The radiolarians remind us irresistibly of snowflakes, as infinitely varied in pattern, as lacy, and as intricately made. Yet because their shells are fashioned of silica instead of carbonate of lime, they can descend unchanged into the abyssal depths (79).

In passages such as this, beauty and wonder are intertwined with facts about an aspect of aquatic biology, and we see Carson’s literary aesthetic at work. By relating snowflakes to the intricate and lacy pattern of one-celled creatures, Carson moves her readers to a deeper, more profound understanding of the ocean ecosystem. Similarly, when she associates land forms, such as mountains, valleys, cliffs, and caves, to the topography of the ocean floor she allows those of us who have never squeezed into a diving suit and
plunged into the ocean to feel a little more at home under the sea. Here Carson describes how the continental shelf resembles familiar land forms:

Sunlight penetrates to all but its deepest parts. Plants drift in the waters above it; seaweeds cling to its rocks and sway to the passage of the waves. Familiar fishes—unlike the weird monsters of the abyss—move over its plains like herds of cattle. . . . Its submerged valleys and hills, in appropriate parts of the world, have been carved by glaciers into a topography much like the northern landscapes we know and the terrain is strewn with rocks and gravel deposited by the moving ice sheets (58).

Toward the end of *The Sea Around Us*, Carson discusses the human relationship to the sea as a resource for food, minerals, and other commodities. The last chapter, “The Encircling Sea,” chronicles the history of nautical travel and navigation over the globe mentioning the early Polynesians’ use of “stars as moving bands of light . . . sailing toward the stars which they knew passed over the islands of their destination” (211). The last words of *The Sea Around Us* return to the first in which the concept of time past and passing provides the philosophical perspective that appeals so strongly to her readers: “For all at last return to the sea—to Oceanus, the ocean river, like the ever-flowing stream of time, the beginning and the end” (216).

*The Edge of the Sea*

Rachel Carson’s third book about the ocean, *The Edge of the Sea*, perfectly culminates her lyrical trilogy of the sea. Intended to be a “practical guide for identifying plants and animals at the shore,” it reads more like a collection of personal nature essays, for in this book Carson is most intimate with her reader. Her tone is confiding, her voice a
whisper, as though she and her reader are exploring the tide pools together—a special shared experience between friends:

Whenever I go down into this magical zone of the low water of the spring tides, I look for the most delicately beautiful of all the shore’s inhabitants—flowers that are not plant but animal, blooming on the threshold of the deeper sea. In that fairy cave I was not disappointed. Hanging from its roof were the pendent flowers of the hydroid Tubularia, pale pink, fringed and delicate as the wind flower. Here were creatures so exquisitely fashioned that they seemed unreal, their beauty too fragile to exist in a world of crushing force (3-4).

We can almost see Carson crouching precariously on the rocks at the tide line, completely absorbed by the spectacular beauty of sea urchins and ghost crabs, sea sponges and sand worms, starfishes and sea pansies. *The Edge of the Sea* is an excellent guide to the rich diversity of life found along the Atlantic coast and includes an illustrated glossary in the back to help with identifying protozoa to octopods. However, Carson reminds her readers that observing life forms in their natural habitat is far more exciting than knowing its scientific name:

To understand the shore, it is not enough to catalogue its life. Understanding comes only when, standing on a beach, we can sense the long rhythms of earth and sea that sculptured its lands forms and produced the rock and sand of which it is composed; when we can sense with the eye and ear of the mind the surge of life beating always at its shores—blindly, inexorably pressing for a foothold. . . .

To understand the life of the shore, it is not enough to pick up an empty shell and say, “This is a murex,” or “That is an angel wing.” True understanding demands intuitive comprehension of the whole life of the creature that once inhabited this empty shell: how it survived amid surf and storms, what were its enemies, how it found food and reproduced its kind, what were its relations to the particular sea world in which it lived (vii-viii).
The environment making this ecosystem possible is described in detail, from the mineral composition of sand, to the rhythmic ebb and flow of tides drawn high or low by the moon, to the ways animal and plant life have adapted to the rock- or coral-rimmed perimeter of the sea. Carol B. Gartner describes Carson’s lyrical evocations of tide pool life as “fascinating verbal equivalents of paintings with multiple levels of artistic illusion” (79). Her multi-faceted view of tide pool exploration does nothing to detract from the integrity of the science, but, as Rosalind Srb Mayberry writes, is another excellent example of Carson’s “perspectival nature of seeing”:

She does not agonize over the problematic of narrative; she is not at all troubled by the necessity for the subjective human lenses, for the need to supplement science by poetry. She moves comfortably between lenses, seeming often to stack the lens of science and the lens of poetry, tinkering with foci, purposefully changing her vision, and ours, in order to shed light on the natural world (131).

Mayberry’s analogy of two lenses through which Carson views and experiences the natural world beautifully illustrates how her literary aesthetic is realized. When she “stacks the lens of science and the lens of poetry,” viewing the world through both, a refraction of new meaning is visible; a clearer understanding of reality reveals itself.

Not surprisingly, one of the ways in which Carson brings to light the unusual and interesting creatures inhabiting tide pools is through figurative language. The following passage combines metaphor, simile, and allusion to correlate a starfish’s physiology with a cosmic mirage:

And sometimes a starlike pattern twinkled in that firmament of sand, proclaiming that one of the sand-dwelling starfishes lay below, marking out its image by the flow of water currents, as the animal drew sea water
through its body for respiration, expelling it through many pores on its upper surface. If the sand was disturbed, the astral image trembled and faded, like a star disappearing in mist, as the animal glided away rapidly, paddling through the sand with flattened tube feet (140).

In such passages we see a balance of factual, technical language—"the animal drew sea water through its body for respiration"—interspersed with poetic narrative—"starlike pattern twinkled," "firmament of sand," "glided away," "paddling through sand"—and metaphors and similes—"astral image trembled . . . like a star disappearing in mist."

Carson thus brings the text to life; you can see the living, breathing starfish as well as the tell-tale signs of its presence in its seaside habitat. The use of words loaded with symbolic meaning further re-enchants this mostly biological text.

For instance, the word astral has a mystical connotation, bringing to mind, in a poetic sense, the heavens, the stars, the cosmos. Firmament is one of those words that might lead to Genesis and the very origin of the world. Whether we believe the Bible or not, for those raised in the Western world, Biblical prose has likely made an impression on them. Carson's use of the word "firmament" thus conjures up a whole host of emotions infusing her prose with more meaning.

Metaphors and similes are woven throughout The Edge of the Sea, as Carson explains why mole crabs are named after the sightless mole, delightfully describing how they feed by burrowing into the shore sand just deep enough so the waves will flow over them. In the following two excerpts, Carson allows herself a bewitching flight of fancy:

It is an extraordinary thing to watch the sand come to life if one happens to be wading where there is a large colony of the crabs. One moment it may seem uninhabited. Then, in that fleeting instant when the water of a
receding wave flows seaward like a thin stream of liquid glass, there are suddenly hundreds of little gnome-like faces peering through the sandy floor—beady-eyed, long-whiskered faces set in bodies so nearly the color of their background that they can barely be seen (154).

This is an ideal example of Carson’s ability to re-enchant science. Her use of alliteration and soft liquid letter sounds create a sense of floating gently on lilting waves: “...when the water of a receding wave flows seaward like a thin stream of liquid glass.” The image of “hundreds of little gnome-like faces peering through the sandy floor” is reminiscent of a childhood fairy tale. As though watching the mole crabs on a stage, Carson is fascinated by the illusion of the “strange little troglodytes” who disappear before her eyes:

And when, almost instantly, the faces fade back into invisibility, as though a host of strange little troglodytes had momentarily looked out through the curtains of their hidden world and so abruptly retired within it, the illusion is strong that one has seen nothing except in imagination—that there was merely an apparition induced by the magical quality of this world of shifting sand and foaming water (154-155).

By alluding to a fictional character we may have encountered in a myth or fairy tale, such as a gnome, the mole crabs become more familiar—even endearing—to us. Whimsical humor such as this animates the text, and for a moment Carson steps outside her role as aquatic biologist, and is just a person like you or me, fascinated by the world of this strange little crab. A curiously mystical guidebook, the first chapter of *The Edge of the Sea* opens with:

There is a common thread that links all these scenes and memories—the spectacle of life in all its varied manifestations as it has appeared, evolved, and sometimes died out. Underlying the beauty of the spectacle there is meaning and significance. It is the elusiveness of that meaning that haunts
us, that sends us again and again into the natural world where the key to the riddle is hidden (7).

**Silent Spring**

The publication of *Silent Spring* in 1962 marks the beginning of Rachel Carson’s notoriety as “the foremother of modern environmental literature” (Gates and Shteir 20) and the unofficial “launching” of the modern environmental movement. I have never seen anyone refer to this time as the “dawning” of the movement because it seemed to start with a bang—thanks to the clamorous controversy caused by *Silent Spring*. Considered one of the most influential books of the twentieth century, *Silent Spring* is still a classic, retaining much of the potency it had in the 1960s as a shocking exposé of the pesticide industry.

The publication of *Silent Spring* also marked a critical turning point in Carson’s writing style—moving her out of a rhapsodic mode to a more jeremiadic one. In her earlier books, she occasionally cautions against practices that may harm the environment, but her focus is primarily on marine biology and the wonders of the earth; she writes to generate joy, not horror and alarm. Fundamentally, Carson hoped her books would help people to appreciate and respect the natural world. When the threat of widespread pesticide contamination loomed too large to ignore, Carson still wanted to inspire appreciation and respect in her readers, but was forced to adopt a new mode of writing she would rather have avoided:

The time had come when it must be written. We have already gone very far in our abuse of this planet. Some awareness of this problem has been in
the air, but the ideas had to be crystallized, the facts had to be brought together in one place. If I had not written the book I am sure these ideas would have found another outlet. But knowing the facts as I did, I could not rest until I had brought them to public attention (qtd. in Brooks, House 228).

Silent Spring is a brilliant work of natural history, life science, and ecology, and qualifies as a true environmental polemic. Without question, Carson wrote Silent Spring to draw attention to an urgent environmental crisis to try to change the world for the better. In an essay on the politics of American nature writing, Scott Slovic writes: “Nature writers have long understood their work as a combination of epistemological exploration and political persuasion” (84). In Silent Spring, Carson combines these two approaches by focusing on the epistemological value of nature literacy, of human beings finding wonder and solace in nature in order that they may be more inclined to preserve and protect it. Herein lies the persuasive, or polemical, quality that emerges in Silent Spring, as well as the jeremiad, for without such strong words of caution the book would have had little lasting impact.

While more technical and fact-driven, Silent Spring retains some of the rhapsodic, or “epistemological exploration,” language inherent in Carson’s earlier books and nature writing. The difference detected in this book is the author’s intention to alarm—a necessary emotional response to a life-threatening situation. In the chapter on the failure of chemical insecticides to solve the problem of insect damage, Carson writes:

To have risked so much in our efforts to mold nature to our satisfaction and yet to have failed in achieving our goal would indeed be the final irony. Yet this, it seems, is our situation. The truth, seldom mentioned but there
for anyone to see, is that nature is not so easily molded and that the insects are finding ways to circumvent our chemical attacks on them (245).

Occasionally Carson returns to the rhapsodic mode when she champions the value—both as helpful predator and marvelous wonder—of dragonflies:

Everywhere in field and hedgerow and garden and forest, the insect predators and parasites are at work. Here, above a pond, the dragonflies dart and the sun strikes fire from their wings. So their ancestors sped through swamps where huge reptiles lived. Now, as in those ancient times, the sharp-eyed dragonflies capture mosquitoes in the air, scooping them in with basket-shaped legs. In the waters below, their young, the dragonfly nymphs, or naiads, prey on the aquatic stages of mosquitoes and other insects (250).

Carson’s three biographers share similar opinions on the specific qualities that make *Silent Spring* such a powerful book, especially the integrity of the information Carson crystallizes for her audience. Paul Brooks writes that Carson’s sense of outrage at man’s heedless tampering with nature, the unwelcome awareness that it was now possible literally to destroy the physical world, undoubtedly played a part in [her] ultimate decision to write *Silent Spring*. It also gave to that epoch-making work a moral conviction which intensified the impact of its scientific facts (*House* 8).

Carol B. Gartner justifies Carson’s polemical tactics, claiming that “what makes *Silent Spring* transcend topic argument and muckraking journalism is that under all the polemics and emotion, with all the facts and narratives, Carson transmits the core of her ecological philosophy” (107). And Linda Lear notes that “Carson’s moral as well as scientific convictions were to give a prophetic quality to *Silent Spring* that would make it something more than a popular exposition of a technical crisis” (*Witness* 228). Moral conviction and prophesy run heavily throughout the book, but through her literary aesthetic, Carson never
loses touch with the root of the issue: the preservation of life, of mystery, of beauty in all its myriad forms.

Paul Brooks felt nature writers had the ability, and the responsibility, to raise environmental awareness through language. Stressing this conviction, Brooks writes:

... it would depend on the efforts of articulate naturalists who ... could take the facts of science and transmute them into literature. Americans must be made to recognize the natural world as part of their culture. Preaching, however impassioned, would never do it. Poetry would: that is, in the broad sense of any writing that seizes on the reader's imagination and reveals the poetic truth that lies beneath the scientific fact (Speaking 4).

Carson knew that writing about this most difficult of subjects—pesticides—depended on her, partly because of her fame as a respected and popular nature writer, but mostly due to the fact that she felt an obligation to speak out. Paul Brooks remembers that Carson said, "'There would be no peace for me . . . if I kept silent.'" (House 228). She did preach a little, but she also brought poetry to the task of illuminating a complicated and frightening issue.

Carson opens Silent Spring with a fable that sets the stage for what will follow in the book. She describes a pastoral landscape "where all life seemed to live in harmony with its surroundings" and names the wildlife—foxes, birds, fish, and plant life—"laurel, viburnum and alder, great ferns and wildflowers"—alongside a peaceful town and scattered farms. Then, she writes:

a strange blight crept over the area and everything began to change. Some evil spell had settled on the community: mysterious maladies swept the flocks of chickens; the cattle and sheep sickened and died. Everywhere was a shadow of death (2).
Adults and children sicken and die. Birds, bees, and fish disappear. Vegetation turns brown and withers "as though swept by fire." A mysterious white power has fallen like snow and settled everywhere, and Carson writes: "No witchcraft, no enemy action had silenced the rebirth of new life in this stricken world. The people had done it themselves" (3).

The ominous tone of this fictional fable is clearly intended to alarm. Carson explains, however, that her parable is not absolutely fictional, but is based on numerous actual events which have occurred somewhere in the world. She exhorts the reader:

A grim specter has crept upon us almost unnoticed, and this imagined tragedy may easily become a stark reality we all shall know. What has already silenced the voices of spring in countless towns in America? This book is an attempt to explain (3).

With its overtones of doom, *Silent Spring* is a radical departure from the rapturous celebrations of wonder and delight which resonate in her previous work. The delight and wonder which she conveys in her earlier books and essays is mostly replaced in *Silent Spring* with case histories of pesticide damage, information on the intricate biological systems that support life, and detailed descriptions of how pesticides disrupt, and even destroy, living organisms. Despite the oftentimes relentless listing of case after case of pesticide poisoning, Carson's stridency emboldens us to confront the issue. On the last page of the chapter entitled, "And No Birds Sing," she asks:

Who has decided—who has the *right* to decide—for the countless legions of people who were not consulted that the supreme value is a world without insects, even though it be also a sterile world ungraced by the curving wing of a bird in flight? (127).
Her voice is now one of impassioned cry for ecological justice—for all living things whose existence is endangered by the reckless behavior of misguided human beings.

In the chapter titled, “Needless Havoc,” Carson raises questions that are “not only scientific but moral,” then asks “whether any civilization can wage relentless war on life without destroying itself, and without losing its right to be called civilized” (99). From a report, Carson relates the “mute testimony” of dead ground squirrels, which “exhibited a characteristic attitude in death. The back was bowed, and the forelegs with the toes of the feet tightly clenched were drawn close to the thorax. . . . The head and neck were outstretched and the mouth often contained dirt, suggesting that the dying animal had been biting at the ground.” She then asks her reader: “By acquiescing in an act that can cause such suffering to a living creature, who among us is not diminished as a human being?” (100).

However powerful and justified her moralistic temper, *Silent Spring* is also an ardent dissertation on the interrelatedness of living organisms to one another and their environment. Particularly in the chapter titled “The Earth’s Green Mantle,” Carson makes crystal clear the ecological biodiversity of various tracts of land that are irrevocably damaged when pesticides are recklessly used. Enveloping this issue is Carson’s ever-present sense of geologic history and the eternal passage of time. The first paragraph from Chapter Two reads:

> The history of life on earth has been a history of interaction between living things and their surroundings. To a large extent, the physical form and the habits of the earth’s vegetation and its animal life have been molded by the environment. Considering the whole span of earthly time, the opposite effect, in which life actually modifies its surroundings, has been relatively
slight. Only within the moment of time represented by the present century has one species—man—acquired significant power to alter the nature of his world (5).

Further along in “The Earth’s Green Mantle,” Carson sharply criticizes a policy to replace naturally-occurring sagebrush with grasses more suitable to cattle grazing. In the first paragraphs she emphasizes the importance of preserving the sage and provides examples of the wildlife dependent upon and the suitability of sagebrush to survive in the climate and topography of this landscape:

One of the most tragic examples of our unthinking bludgeoning of the landscape is to be seen in the sagebrush lands of the West, where a vast campaign is on to destroy the sage and to substitute grasslands. If ever an enterprise needed to be illuminated with a sense of the history and meaning of the landscape, it is this. For here the natural landscape is eloquent of the interplay of forces that have created it. It is spread before us like the pages of an open book in which we can read why the land is what it is, and why we should preserve its integrity. But the pages lie unread (64).

Carson reads this remarkable landscape in the high western plain of the Rocky Mountains and shows us a rich ecosystem: the harsh extremes of climate that formed its topography, the grouse, antelope, mule deer, and domesticated sheep who depend on sage for food cover, or nesting ground, and the triumph of sage itself over a succession of plants that failed to survive in the high, dry, windy environment:

The sage—low growing and shrubby—could hold its place on the mountain slopes and on the plains, and within its small gray leaves it could hold moisture enough to defy the thieving winds. It was no accident, but rather the result of long ages of experimentation by nature, that the great plains of the West became the land of the sage (65).
Carson’s ecological sensibility beautifully complements Aldo Leopold’s classic essay on his ecological philosophy in “The Land Ethic,” especially his criticism of short­sighted, economics-driven land policies:

> It is inconceivable to me that an ethical relation to land can exist without love, respect, and admiration for land, and a high regard for its value. By value, I of course mean something far broader than mere economic value; I mean value in the philosophical sense . . . A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise. . . . An innumerable host of actions and attitudes, comprising perhaps the bulk of all land relations, is determined by the land-users’ tastes and predilections, rather than by his purse. The bulk of all land relations hinges on investments of time, forethought, skill, and faith rather than on investments of cash. As a land-user thinketh, so is he (262-263).

Leopold’s disdain for the anthropocentric and utilitarian view of nature is similar to Carson’s outrage and admonishment of those who propose to radically alter a natural landscape to satisfy economic goals. Both authors write persuasively on the practical or material issues that need attention (land use, water quality, pesticide poisoning) and both also acknowledge that a paradigm shift needs to occur before meaningful change can be realized. Accordingly, Thomas J. Lyon writes in an article entitled “Nature Writing as a Subversive Activity,” that “polemic and analysis are simply two modes among many: awakening of intelligence, and after that, somewhere, sometime, a restored and healthy world” (Lyon 7).

In Silent Spring, Carson uses language that on one hand educates the reader about the actual, biological implications of the potential hazard, and on the other grabs the reader’s attention with words that express urgency and concern. In her discussion about
the chemical spraying of sage brush, Carson writes, “even if the program succeeds in its immediate objective, it is clear that the whole closely knit fabric of life has been ripped apart” (67). Then she explains that if the sages disappears, the wildlife and the sheep (who depend on sage for winter grazing) would perish also. Furthermore, Carson reminds her readers that “the spraying also eliminates a great many plants that were not its intended target” (73). From Wyoming to Maine, the chapter has example after example of the devastation caused by chemical spraying of herbicides. She makes a case for ceasing the spraying of insecticides also, stressing the importance of and our dependence on pollinating insects:

Without insect pollination, most of the soil-holding and soil-enriching plants of uncultivated areas would die out, with far-reaching consequences to the ecology of the whole region. . . . Now clean cultivation and the chemical destruction of hedgerows and weeds are eliminating the last sanctuaries of these pollinating insects and breaking the threads that bind life to life (73).

While subtly done, Carson skillfully sets up her adversaries to create conflict. Placing diametrically-opposed subjects together effectively reveals her opinion about the issue, as shown in the last sentence of the preceding passage: The bad—“Clean cultivation and chemical destruction” is pitted against the good—“the last sanctuaries of these pollinating insects and breaking the threats that bind life to life.” Carson was never vague; she strove to clarify the issues that affected her readers; she strove to empower the nonspecialist.

In the 1950s, the organochloride pesticide most in use for spraying fields and roadsides was 2,4-D which “has been shown experimentally to disturb the basic physiological process of respiration in the cell, and to imitate X-rays in damaging the
chromosomes” (76). Before Carson highlights the destructive capabilities of synthetic pesticides, she must first describe the marvelously intricate processes that take place in the actual building blocks of life, the cell. In true Carson style, she employs the aid of similes and metaphors to illustrate the inner workings of cells:

The process by which the cell functions as a chemical factory is one of the wonders of the living world. The fact that all the functioning parts are of infinitesimal size adds to the miracle. . . . Yet the greater part of the work of oxidation is performed in a theatre far smaller, in tiny granules within the cell called mitochondria (201-202).

The rhapsodic returns to Carson’s prose as she discusses the wondrous miracle of life housed in the living cell. The function of mitochondria becomes paramount since it supplies energy where it is needed in the body; for instance, where muscle fibers need to contract, where impulses need to occur between nerve cells, and “in sperm cells they are concentrated at the point where the propellant tail is joined to the head” (201). A molecule called ATP (adenosine triphosphate) is explained as

the universal currency of energy—found in all organisms from microbes to man. It furnishes the mechanical energy to muscle cells; electrical energy to nerve cells. The sperm cell, the fertilized egg ready for the enormous burst of activity that will transform it into a frog or a bird or a human infant, the cell that must create a hormone, all are supplied with ATP” (202-203).

The “coupling” or “close linking” that takes place between ATP and the process of oxidation within cells is the life-producing or -sustaining process that pesticides are designed to disrupt. Through lucid and descriptive language describing the functioning of

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cells, for instance, Carson explains what exactly takes place when any one of the many pesticides unleashed into the environment is absorbed by a living organism, for instance:

[mating robins whose] blue-green eggs . . . lie cold, the fires of life that flickered for a few days now extinguished . . . . Did the eggs of the birds, like those of the laboratory frogs, stop developing simply because they lacked enough of the common currency of energy—the ATP molecules—to complete their development? (206-207)

Carson answers this question in the next paragraph stating that a high concentration of DDT residues have been found in the eggs of birds:

It is hard to see how any egg so loaded with residues could complete the complex process of development: the infinite number of cell divisions, the elaboration of tissues and organs, the synthesis of vital substances that in the end produce a living creature. All this requires vast amounts of energy—the little packets of ATP which the turning of the metabolic wheel alone can produce (206-207).

Silent Spring is more than a polemic that admonishes, or a jeremiad that warns—it also offers viable biological solutions to control destructive insects. Carson urged restraint and care in the use of deadly chemicals, predicting that not only would birds perish along with insects, but that human beings as well are affected by their environment. She cites the possibility that incidents of human cancer would likely rise if pesticides continued to enter the environment at the alarming levels documented in Silent Spring. She writes:

The choice, after all, is ours to make. If, after having endured much, we have at last asserted our “right to know,” and if knowing, we have concluded that we are being asked to take senseless and frightening risks, then we should no longer accept the counsel of those who tell us that we
must fill our world with poisonous chemicals; we should look about and see what other course is open to us (277-278).

**The Sense of Wonder**

Another book, published posthumously, bears Rachel Carson's name. *The Sense of Wonder* (1965), which first appeared as an essay in the July 1956 *Woman's Home Companion* under the title, "Help Your Child to Wonder," is an enduring example of nature writing at its best. Carson began work on the essay between *The Edge of the Sea* and *Silent Spring*. She had hoped to develop it into a book that would inspire parents to learn and experience nature with their children. After Carson's death, friends and colleagues compiled the text with photographs and published it as a book for families to share. It is dedicated to Roger, Carson's adopted son.

The following passage, which appears toward the end of the essay, epitomizes the spirit and beauty comprising Carson's literary aesthetic:

I am sure there is something much deeper, something lasting and significant. Those who dwell, as scientists or laymen, among the beauties and mysteries of the earth are never alone or weary of life. Whatever the vexations or concerns of their personal lives, their thoughts can find paths that lead to inner contentment and to renewed excitement in living. Those who contemplate beauty of the earth find reserves of strength that will endure as long as life lasts. There is symbolic as well as actual beauty in the migration of birds, the ebb and flow of the tides, the folded bud ready for the spring. There is something infinitely healing in the repeated refrains of nature—the assurance that dawn comes after night, and spring after the winter (100-101).
In 1952, Henry Beston wrote the following words praising the poetic quality of Rachel Carson’s first book, *Under the Sea-Wind*:

The poetic sense is justification of man’s humanity; it is also the justification of the inexplicable world. No matter what astronomers make of the sun, it is always more than a gigantic mass of ions, it is a splendor and a mystery, a force and a divinity, it is life and the symbol of life. It is Miss Carson’s particular gift to be able to blend scientific knowledge with the spirit of poetic awareness, thus restoring to us a true sense of the world (in Lear, *Witness* 238).

Beston’s words are more than modest flattery of a colleagues’ good writing. His views were shared by hundreds, maybe thousands of admirers, as we have seen. Thirty-six years after Carson’s death in 1964, her books have stayed in print and continue to be read by new generations. Rachel Carson was one of many significant writers who not only heralded the age of environmentalism, but conceived and nurtured a new approach to science literature and nature writing. She could write in the rhapsodic mode to enthral, in the poetic to illustrate scientific facts and principles, the jeremiad to incite concern, and the polemic to motivate action for positive change. And all these modes could be woven together in a tapestry of diverse threads representing the many aspects of living, thinking, and being. Ecology, for Rachel Carson, was not only the biological web of life, but the spiritual, intellectual, and sensual interrelations that coalesce in human life and experience. This is what informs and perpetuates a literary aesthetic that is Carson’s legacy to the world and to the nature, science, and environmental writers who succeed her.
Epilogue

As a writer, I believe that it is our task, our responsibility, to hold the mirror up to social injustices that we see and to create a prayer of beauty. (Terry Tempest Williams)

Two women—both writers and scientists, both significantly affected by cancer, and both dedicated activists for environmental protection, are carrying Rachel Carson’s banner into the twenty-first century. Children of the post-war era, Terry Tempest Williams, author of *Refuge: An Unnatural History of Family and Place* and Sandra Steingraber, author of *Living Downstream: An Ecologist Looks at Cancer and the Environment*, could be Carson’s nieces or daughters. There is a sense of kinship because their lives have intersected in serendipitous ways. One of the major topics of William’s book is the flooding of the Bear River Migratory Bird Refuge at the Great Salt Lake, which Carson visited when it was first established. Steingraber’s book, which in many ways picks up a generation after *Silent Spring*, honors Carson as a woman who struggled silently with her disease while composing the most significant and long-ranging literary event of her life.

Williams grew up within sight of the Great Salt Lake and recalls seeing a flash in the desert at the age of five, which turned out to be a government-sponsored detonation of a nuclear bomb. *Refuge* is a memoir of her mother’s illness and death from ovarian cancer against the backdrop of a pending natural disaster as the water in Great Salt Lake begins rising, flooding the surrounding area and disrupting the nesting sites at a migratory bird refuge. Williams’ mother, grandmother, and five aunts all have died from cancer. She is
certain the disease was caused by exposure to radioactive fallout—a result of living
downwind of a nuclear test site. Williams herself has had two biopsies for breast cancer
and a tumor removed from her chest.

The chapters in Refuge, titled with the names of birds, are sometimes only a page
long, and resemble prose poems, journal entries, field notes, or stories told between
friends and family, dialogue recollected, words spoken that are fused into memory.

Trained as an environmental educator, Williams, like Carson, writes to educate the public
about the natural world.

**Excerpts from Refuge: An Unnatural History of Family and Place**

Up ahead, two dozen white pelicans were creating a spiral staircase as they flew. It
looked like a feathered DNA molecule. Their wings reflected the sun. The light shifted,
and they disappeared. It shifted again and I found form. Escher’s inspiration. The
pelicans rose higher and higher on black-tipped wings until they straightened themselves
into an arrow pointing west to Gunnison Island (40).

There is a chorus of wings navigating the planet. Twenty million shorebirds migrate
through the United States each year to arctic breeding grounds in the spring and back to
their wintering sites in South America. One bird may cover as many as fifteen thousand
miles in a year (264).

We have lost track of time in a birdwatchers’ trance. Egret plumes like French lace billow
in the breeze and underscore their amorous play. One egret rises, the other follows. Their
steps are light and buoyant. . . . The two egrets stagger their leaps—one lifts, one lands,
one lifts, one lands—and the dance continues (49).

Mother and I break bread for the geese. We leave small offerings throughout the
meadow. It is bread made by the monks from stone-ground grain. She puts her arm back
through mine as we walk shoulder-high in sunflowers (193).
Sandra Steingraber also comes from a family deeply affected by cancer. Her mother had breast cancer and several other relatives have died from the disease. Steingraber was diagnosed with bladder cancer at the age of 20 and continues to struggle with recurrences. In 1998, she gave birth to a baby girl she and her husband named Faith, and is currently working on a book about the ecology of pregnancy and childbirth. Like with Emily Dickinson, Steingraber is a kindred spirit of Rachel Carson—rebellious in their own ways, using the pen to elucidate, educate, and elicit desire in others to act on behalf of nature and the sanctity of life. Like Carson, Steingraber is a biologist who writes poetically. She has one volume of published poetry and co-wrote a book on the politics of famine before embarking on her quest to determine the environmental links to certain types of cancer. Like Silent Spring, Steingraber’s book makes a case for the rising rates of cancer citing the mountains of evidence (however considered inconclusive by well-funded cancer experts) that show human-caused carcinogens continue to be released into the air, water, and soil and are found in the food we consume and the material culture that is part of our living environment.

Steingraber has been called a “poet with a knife,” who writes with lyrical precision about a difficult subject—industrial waste, pesticides, PVC, and dioxin and the synergistic affect of these and other possible pollutants that disrupt the normal, healthy function of living organisms. Her book is a memoir much like William’s Refuge, but its focus is more like Carson’s, to elucidate a difficult and painful subject and to inspire positive and proactive change for a healthier world.
Excerpts from *Living Downstream: An Ecologist Looks at Cancer and the Environment*

On a clear night after the harvest, central Illinois becomes a vast and splendid planetarium. This transformation amazed me as a child. In one of my earliest memories, I wake up in the back seat of the car on just such a night. When I look out the window, the black sky is so inseparable from the plowed, black earth—which dots are stars and which are farmhouse lights?—that it seems I am floating in a great, dark, glittering bowl (1).

A mosaic of islands and jutting peninsulas. Pieces of a crazy quit tossed into a lake. A raft of vines tangled with shards of crockery. There is no one way to describe them. Collectively or alone, cancer cells are more chaotically arranged than the shy, scurrying animals from which the disease—as well as the zodiac constellation—derives its name. Cancer, carcinogen, carcinoma, from the Greek *karkinos*, the “crab” (118-119).

About one-third of Americans draw their water from aquifers. The rest drink from rivers, lakes, and streams. Of course, ecologically speaking, everyone drinks from aquifers: all running surface water was at one time groundwater, aquifers being the mothers of rivers. As Rachel Carson pointed out, contamination of groundwater is, therefore, contamination of water everywhere (210).

During the last year of her life, Rachel Carson discussed before a U.S. Senate subcommittee her emerging ideas about the relationship between environmental contamination and human rights. The problems addressed in *Silent Spring*, she asserted, were merely one piece of a larger story—namely, the threat to human health created by reckless pollution of the living world . . . She urged recognition of an individual’s right to know about poisons introduced into one’s environment by others and the right to protection against them. These ideas are Carson’s final legacy (266).
Works Cited


