BREAKING SILENCE WITH THE SOUNDS OF THE SEA: OTHER WORDS ON RACHEL CARSON AND THE THREE SEA BOOKS

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ABSTRACT

Philip Terrie, Advisor

This study is grounded in feminism(s) and focuses exclusively on Rachel Carson's sea books, Under the Sea-Wind, The Sea Around Us, and The Edge of the Sea. In "Mother, Sea, and Material Immortality," I explore the cycles that constitute Carson's concept of material immortality and suggest that the underlying theoretical framework is inherently matrilineal. Then, I demonstrate how Carson undermines sex, gender, and heterosexuality as stable categories and promotes a powerful ethic of caring without essentializing experiences associated with women. In "Parting Fronds and Probing Fingers: Rachel Carson Takes her Love to the Sea," I assert that Carson promotes the perspective of a woman-identified-woman and lesbian when she portrays communal spaces in the natural world that are cooperative, collaborative, and collective. Furthermore, I argue that Carson creates a lesbian narrative space by upsetting heterosexual privileging of difference in favor of sameness. In "Living on the Edge: Locating the Other in Rachel Carson's Three Studies of Shores and Seas," I utilize ecofeminist literary criticism in order to examine Carson's rendering of life in layers and zones as they reflect the realities of a human world stratified by categories of identity. I consider Carson's work as a scientist and her engagements with scientific ideology, epistemologies, and institutions in "Science, Sisters, and the Sea: Rachel Carson and her Refusal to be Silent on Matters of Science in the Sea Books." Finally, I conclude with a recognition that there is much more work to be done on Carson and her writing and suggest some areas for additional inquiry.

To my family, my mother Christine Sullivan, brother Brian K. Sullivan, soul sisters Samantha L. Bloodhart, Chavy Michalitsch, and Yvonne Tate, kindred spirits Abbey, Rima, and Cricket, and for the ground I cherish in Otsego County, Michigan.

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I received a lot of compassion, understanding, and support while I negotiated hurdle after hurdle in pursuit of my degree. On campus, I am incredibly grateful to Joyce Eastlund Gromko of the Graduate College, James Kettinger from Student Health Services, Gail McRoberts of the Graduate College, Mary Ann Sweeney from the English Department, Barbara Toth from the Writers Lab, and Mary E. Zachary from Jerome Library. Off campus, I am deeply indebted to H. Patricia Hynes, John Juriga, Linda Lear, and John Malacos.

For me, this was a solitary process and I've missed my social connections! While I spent much of the last two years on my own, confined to my house (or haunting nearby woods), I must recognize the artists, activists, and scholars who inspired me, sustained me, and kept me company throughout. In addition to Rachel Carson, I am grateful to Margaret Atwood, Susan Cavin, ani difranco, Natalie Merchant, Sinéad O'Connor, Toshi Reagon, Nina Simone, and Virginia Woolf.

TABLE OF CONTENTS

LIST OF ABBREVIATIONS USED

When referring directly to the books listed below, I use complete titles. In parenthetical notations I use to corresponding abbreviation. Complete publishing information is available in the "References" section.

Book Title	Abbreviation
Under the Sea-Wind	UTSW
The Sea Around Us	TSAU
The Edge of the Sea	TETS
Silent Spring	SS
The Recurring Silent Spring	RSS
Rachel Carson: Witness for Nature	WFN
Has Feminism Changed Science?	HFCS
Nature's Body: Gender in the Making of Modern Science	NB

PREFACE

I was moved to pursue this project because of Rachel Carson, her incredible vision, her beautiful writing, and her extraordinary spirit. From my earliest encounters with the sea books, I was impressed by the radical authority conveyed in Carson's descriptions of the natural world, the compelling activist strategies contained in her writing, and the cogent philosophy communicated throughout. Yet, during the initial steps of the dissertation process, I was frequently perplexed and confounded by incongruities in public and biographic portraits of Carson as well as significant gaps in the scholarship on her writing. While I outline Carson's public record and the state of scholarship on her work in the chapters that follow, I also make strong arguments in defense of her significant critiques, comments on, and contributions to Western social systems, the ideologies that support them, and the institutions that preserve them.

My intention was to provide some redress for what one scholar has referred to as "benign neglect" of Carson's work and to correct the notion that Carson did not reveal her own inner landscape in her writing about the natural world (Glotfelty 167). However, that redress required me to spend significant amounts of time clarifying contexts and establishing foundations in order to begin to make the critical connections I find most interesting. In other words, I found I could not proceed with my own ideas about Carson and her writing without establishing some firm, common ground. While this work was absolutely necessary, it sometimes occurs at the expense of depth in discussions of literary criticism.

As a positive outcome of my approach, I have opened many doors and laid foundations for much additional work to be done. I believe there is much to be learned from caregivers and activism that is gentle and persistent, and I believe that serious engagement with Carson's writing will point to an emerging epistemology that is a viable alternative to Western, patriarchal ideologies of oppression. In addition, I propose that

substantial studies of Carson's sea books can contribute to discussions of an ecofeminist literary aesthetic as well as advancement in ecofeminist politics. My hope for this dissertation is that it be the beginning of an exploration that will continue from where I leave off, and in the concluding section I suggest some directions for additional inquiry. Indeed, I hope to continue much of this work, myself, although the water is fine for others to jump in and join me.

CHAPTER I.

BREAKING SILENCE WITH THE SOUNDS OF THE SEA:

OTHER WORDS ON RACHEL CARSON AND THE THREE SEA BOOKS

Rachel Carson is often credited with founding the modern environmental movement, primarily because of her fourth book, Silent Spring (Shirk 86). In it, she demonstrates and predicts the catastrophic consequences caused by the disruption of natural systems through the unrestrained production and use of chemicals in industry and agriculture. Silent Spring is cyclical in structure, relentless in purpose, and persuasive in prose; the strength and clarity of Carson's science is no less for the highly metaphorical language or the literary devices she uses. She has been referred to as an activist scientist because her concerns surpassed the identification and explication of chemical hazards in the environment by questioning "the cultural authority of science" as it was practiced by many of her contemporaries (Proctor 53). Furthermore, by arguing that "individuals had a right to be protected from poisons applied by others to the environment and that they should have a right to legal redress when this right is violated," Carson preempted environmental justice platforms 30 years after Silent Spring (Taylor 55-6). Similarly, Carson has been identified as a key figure "in pioneering the green movement of the late twentieth century" (Mellor 15) and her influence is evident in "every manifestation of the current environmental movement—Earth Day, [. . .] grassroots environmentalism, ecofeminism and women's environmental activism" (Hynes, RSS 46). It is difficult to imagine areas of modern life not touched by some aspect of her work.

For many, Silent Spring has come to represent the apogee of Carson's body of work. For H. Patricia Hynes in her study, The Recurring Silent Spring, Carson's primary accomplishment in Silent Spring was "the fusion of her ethical passion for nature with a

hard-eyed, political realism," qualities that, she notes, also ensured the book's endurance (43). The impact of Silent Spring on public consciousness has been compared to that of Thomas Paine's Common Sense, Harriet Beecher Stowe's Uncle Tom's Cabin, and Upton Sinclair's The Jungle (McCay 63). Supreme Court Justice William O. Douglas called Silent Spring the "most important chronicle of this century for the human race" (Bonta 262), and according to Rebecca Raglon in her essay "Rachel Carson and Her Legacy,"

> Few writers have challenged the potent North American ideology of progress as thoroughly and forthrightly as Rachel Carson. Even in such company as Henry David Thoreau, John Muir, and Aldo Leopold, Carson was notable, for she was more successful than any other writer in alerting the public to the assumptions that were responsible for creating dangerous, irreversible changes in the environment. (196)

Carson's commitment to her beliefs extended well beyond the writing of books. She testified before Senator Abraham Ribicoff's Subcommittee on environmental hazards (Bonta 271) as well as the Senate Commerce Committee as it considered bills "to prevent federal spraying without state knowledge and require stronger warnings about pesticide hazards to wildlife" (Lear, WFN 455). Though castigated by critics in science and industry as a menacing, misinformed outsider, she was validated and her work was ultimately affirmed by President John F. Kennedy's Science Advisory Committee (Bonta 262).[1] As a result of the controversies stirred and agitated by Silent Spring, the federal government organized the Environmental Protection Agency.

Armed with an academic background in science, a 16-year career in government service as a scientist, writer, and editor, a long and notable record as a popular nature writer, and an even longer history of interaction with the natural world, Carson was well prepared to produce a text such as Silent Spring. Biographer and environmental

historian Linda Lear asserts that Silent Spring "polarized government, science, and industry, and made people stop in their tracks and see the world in a new way" ("Rachel Carson's SS" 28). Together, Carson and ally W.C. Hueper "did for industrial disease what Pasteur and Koch had done for infectious disease" (Proctor 53).[2] Perhaps most fascinating is the enduring, yet often unacknowledged, quality of her work. Hynes, herself a scientist and writer, explains,

> So thorough is her research that Silent Spring has served as a fundamental text on ecology—neither outdated nor inaccurate—which need only be amplified with the subsequent development of ecological methods of pest control, such as integrated pest management, and recent research on environmental toxicology which was spurred on by her work. (RSS 14-5)

Literary critic Carol Gartner makes a similar observation regarding Carson's second of four books The Sea Around Us, when she claims that nearly "all the basic information about the sea is still valid, but most important, Carson provides a clear pattern so the reader can easily judge what material is dated" (67). In addition, Carson's work influenced and inspired an emerging generation of scientists and activists. Ralph Nader remembers the first stirrings of his conscience when he was a student at Princeton and witnessed "the death of song birds in the university commons after aerial spraying of DDT" (Lear, "Rachel Carson's SS" 40), and Carson biographer and literary critic Mary McCay claims there are at least "three books that owe their existence, in large part, to what Carson was able to achieve with Silent Spring," including Jonathan Schell's The Fate of the Earth, Bill McKibben's The End of Nature, and John McPhee's The Control of Nature (100).

In Silent Spring, as in all of Carson's work, the values and perspectives of nonscientists, amateur naturalists, and backyard birders are prized and promoted.

Moreover, for Raglon, "Silent Spring marks a turning point as the supporting role women had played in conservation issues was transformed into a more proactive role" (196). In Made from this Earth: American Women and Nature, Vera Norwood argues that Carson was the center of a vast "web of women from various walks of life who shared [. . .] not only a moral understanding of their relationships to nature but also a political commitment" to ensure that the professional men and public officials "incorporated their values into environmental policy" (171). Carson helped empower women in the public sphere, but she reached into and validated private spaces, as well. Carson touched the lives of women in particular, "not by the force of her personality, but rather by the passion and ethical authority of her work" (Hynes, RSS 11). Women responded then, and they continue to respond today. According to Hynes,

> Rachel Carson's profound influence on women generated from the vitalism of her own work, but also from the primary and vital place that women held in her own life. This may explain the contagious quality of her work for women since. She was profoundly influenced by women and, in turn, she has done the same, living on in the minds of those who did not know her. (RSS 55)

Of the women whose work has been directly and indirectly impacted by Carson, Hynes lists Carson's literary agent Marie Rodell, artist Shirley Briggs, Ann Cotrell Free, Dr. Rosalie Bertell and others.[3] Hynes includes herself and I would add Lear, scientist and poet Sandra Steingraber, scientist Theo Colborn, the Rachel Carson Council Executive Director, Dr. Diana Post, as well as the dedicated board, staff, and corps of volunteers who maintain The Homestead, Carson's birthplace and childhood home. And then there is the profound effect Carson has had on me. The wealth of her work is great and has provided rich, fascinating bounty to shape this dissertation. In addition, the generosity of

her spirit has inspired me so that the same process has become an incredibly meaningful intellectual and spiritual journey as well as a true labor of love.

In recognition of her literary and scientific contributions, Carson received a Presidential Medal of Freedom, a Department of the Interior's Distinguished Service Award, and a Guggenheim Fellowship. She was awarded the John Burroughs Memorial Association Medal, the New York Zoological Society's Gold Medal, and a National Audubon Society Medal. She was the first woman to receive the Philadelphia Geographical Society's Henry G. Bryant Medal, and the first recipient of the National Council of Women's Woman of Conscience Award. She won a National Book Award, an American Association of University Women Achievement Award, a Schweitzer Award, and a George Westinghouse Science Writing Award. She received honorary doctorates from Drexel Institute of Technology, Oberlin College and Chatham College, and an honorary degree in literature from Smith College (she was offered additional honorary degrees, but turned them down). Additionally, according to Gartner,

> Many things have been named for Carson, among them a nature trail in Pennsylvania, schools in Montgomery County, Maryland, and New York City; research cruisers of the National Marine Fisheries Service and the University of California; and even a peregrine falcon, raised on the roof of the Interior Department building in Washington, in 1979, in an attempt to bring these endangered birds back to our nation's capital. (27)

She is one of a small but elite group of women to be elected into membership of the American Academy of Arts and Science, and was only the second woman hired in a professional, non-administrative capacity at the U.S. Bureau of Fisheries. Her childhood home is a museum in Springdale, Pennsylvania, and listed on the National Register of Historic places. A National Wildlife Refuge in Maine has been dedicated to her, she

appears on a U.S. postage stamp, and she has been inducted into the National Women's Hall of Fame in Seneca Falls, New York.

Given the impressive inventory of accomplishments, above, it might come as a surprise that the body of scholarship on Carson's work is remarkably moribund. Although Carson's writing has been compared to the poetry of Walt Whitman (Gartner 41) and Henry Wadsworth Longfellow (Gartner 122) and her ideas to those of Alexander Pope (Gartner 63), Francis Herbert Bradley and Ludwig Wittgenstein (Shirk 91),[4] such observations refer almost exclusively to Silent Spring. Scholarship on Carson's writing prior to Silent Spring, including the three award-winning books about the sea, Under the Sea-Wind, The Sea Around Us, and The Edge of the Sea, is excrescent, at best. In addition, extant scholarship consists entirely of rhetorical analysis, to the exclusion of all other critical approaches. While there are many fine examples of rhetorical analysis of Silent Spring, including Henrietta Nickels Shirk's essay, "Technical Writer as EcoWriter: The Rhetorical Legacy of Rachel Carson" and the recent collection, And No Birds Sing: Rhetorical Analyses of Rachel Carson's *Silent Spring*, edited by Craig Waddell, this scholarship exists in an unfortunate vacuum that lacks the dimension provided by multiple perspectives and misses the fullness of a comprehensive consideration of Carson's writing.

Similarly startling, with the notable exceptions of Hynes' Recurring Silent Spring, Steingraber's Living Downstream, and Colborn's collaborative work Our Stolen Future,[5] Carson's work has been left largely unexamined by scientists.[6] Bonta characterizes Silent Spring as "the book that gave [Carson] the most fame and the least pleasure" (270), and when asked by an associate to consider writing a book on water pollution, Carson demurred, explaining that "[o]ne crusading book in a lifetime is enough" (Lear, WFN 452). By the time Silent Spring was published in 1962, Carson had been conducting scientific research and writing for the public for twenty years and had earned

an international reputation as the "most highly regarded marine biologist writing for the general public" (Lear, "Rachel Carson's SS" 30). Yet, according to at least one recent scholar, "there is a bitter irony in remembering Carson not for her poetic books about the sea but for her anger and her record of nature's abuse" (Raglon 196-7). I would like my work to correct this imbalance as much as possible. Therefore, in subsequent chapters, I will consider Carson's literary and scientific contributions utilizing various feminist and ecofeminist perspectives, and most significantly, I will bind my analysis entirely to the sea books.

From the earliest examples of her writing, Carson urged readers to respect "those with whom we share the world" and recognize both "our interdependence and the value and glory of all life" (Gartner 117). Carson strove to "weave the web that was to link all creatures of the earth into one harmonious and mutually necessary existence" and this "sense of connectedness" was a guiding principle behind all her work (McCay 23). In 1951, with the publication of The Sea Around Us, Carson drew sustained attention from literary critics, scientists, and the reading public. It sold over 200,000 copies in less than a year, "remained on *The New York Times* best seller list for 86 weeks and was translated into 33 languages" (Proctor 48). The popularity of The Sea Around Us led to renewed interest in Carson's first book, Under the Sea-Wind. A second edition was published in 1952 and it soon joined The Sea Around Us on the *New York Times* top-ten best-seller list.[7] Her third book, The Edge of the Sea, published in 1955, was greeted with similar enthusiasm and appeared on the best-seller list for 23 weeks. For McCay, the sea was Carson's primary focus and finally her greatest symbol. She claims its "creative power and destructive force, its magnitude and infinite variety" attracted Carson, as it had Melville and Conrad, and like those earlier writers, the "ocean became the medium through which Carson spoke to the world" (ix).

Unlike earlier (and even many later) writers, Carson recognized that the sea was a subject too big for one person to manage. In the acknowledgements of The Sea Around Us, Carson confessed that "[t]o cope alone and unaided with a subject so vast, so complex, and so infinitely mysterious as the sea would be a task not only cheerless but impossible, and I have not attempted it" (TSAU xv). And, as was a habit she practiced throughout her life, she proceeded to thank all those who had helped her in her work.[8] This is the first of many sure and steady reminders of connection, interdependence, and community in the sea books; these reminders are intricately woven among expressions of comfort and continuity in the endless recirculation of resources, and assertions of complex scientific information cloaked in beautiful language that sacrifices neither precision nor accuracy. Carson's prowess with prose and the clarity of her thought processes impressed me from the first and grew with gentle insistence throughout my study of her work and her life. Analysis of the sea books provides important opportunities to advance understanding of Carson's ecological philosophy beyond the clarion call for action in Silent Spring, to enhance awareness of the values she communicates clearly and consistently, to identify the radical perspectives she embodies and promotes, and to examine the critiques of science, society, and culture that presage those appearing in Silent Spring and anticipate more recent feminist assessments of patriarchal ideology and institutions.

During my research on Carson, I frequently encountered a palpable web of silence that I am not the first to notice. I came to feminism on the second wave and silence rings for me like a siren. In 1972, Mary Daly called Carson an "early prophet forecasting ecological disaster" and claimed that Silent Spring

> was greeted with noise and babel but despite the awards and praise, essentially it received the silent treatment. Like the mythic Cassandra, who was cursed by Apollo ("the god of truth") to be disbelieved when she

> prophesized truth, Rachel Carson, whose credibility was weakened by her sex, was greeted with superficial attentions and deep inattentiveness. (21)

Almost two decades later, Hynes associated Carson with the single women of medieval Europe who accessed social power when they inherited property, and were in due course persecuted as witches. In the aftermath of Silent Spring, "Carson was blamed for the violence of nature, the destruction of crops and the death of children which her call to curb the use of pesticides would cause" (RSS 19).[9] As an example that is less dramatic but similarly dismissive, Mary Mellor reports in Feminism and Ecology that "government's and chemical industry's response to Carson's warnings was to mock her as an emotional fanatic" and rebuke her as "a spinster in galoshes who worried about birds" (15). These are the images of Carson that have persisted, while serious attention to the significance of Carson's work has waned. It is a sad comment on our culture that Carson's critics had ready access to a litany of loaded images, labels, and stereotypes to contain her. Sadder still is the extent to which her critics have been successful in their efforts to expunge her from public memory.

Despite the push by critics to publicly diminish Carson, there remains a small, but significant undercurrent of attention to her life and work. In her essay, "Writing a Private Life," Emily Herring Wilson recounts a couple of recent experiences indicative of Carson's erasure, but her pursuit of information about Carson suggests an ongoing interest as well. In a Seattle store "the size of a small island, whose sole focus is to outfit human nature for nature," Wilson sought new editions of the sea books (40). She turned to a clerk for directions and is rattled by his response:

> "Who?" he asked; his gray beard had led me to believe he wasn't born yesterday. [Then, back] at home in North Carolina, I talked with a staff member at Lake Mattamuskeet National Wildlife Refuge, who knew a

> great deal about its history, but did not know about Rachel Carson or her classic essay on Mattamuskeet. (40)

Shortly after I began my own research on Carson, I attended a session promoting strategies for teaching her work at the American Women Nature Writers Conference in Castleton, Vermont. I was pleased to find University of Maine writing instructors Laura Cowan, Margery Irvine, and Nancy MacKnight and was impressed by their presentation and the diverse collection of materials they've accumulated and developed for teaching Carson to college students. They even suggested ways in which Carson's achievements as environmentalist, activist, feminist and writer might be incorporated into undergraduate curricula. Yet, they also reported that although the University of Maine enrolls a majority of students from the region, and is located within 30 miles of Carson's adopted home near Boothbay Harbor (where she both lived and worked), and within a similarly short distance to the salt marsh that bears her name, their students rarely know Carson, her work, or the legacy she left behind.

Many of Carson's biographers have participated in the perpetuation of unflattering reflections of her personality and inaccurate images of her life. Hynes has deconstructed the work of a first generation of biographers (who were all men), reproduced by a second generation of biographers (both men and women), and finds objectionable consistent portrayals of Carson as "a withdrawn, often lonely women who lived a full professional life because her books were world-acclaimed, but an unfulfilled existence because she never married" (RSS 9). These accounts were no doubt influenced by critics of Silent Spring, but they are also driven by wider social prejudices and the limitations of traditional biographies. Carolyn G. Heilbrun has made a career conducting feminist analysis of the history and generic development of biographies. She claims that like most literary traditions, biographies reflect and convey masculine perspectives, realities, and privilege, and that "biographies of women, if they have been

written at all, have been written under the constraints of acceptable discussions" of women's roles and concerted "agreement about what can be left out" (Writing a Woman's Life 30). When biographers have looked at Carson, they have seen "exactly what they expected to see," a lonely, prim, spinster whose loneliness was not "existential and conducive to genius, or a tragic but great condition" as Thoreau's and Muir's biographers granted them, but "small, unattractive, and psychological" (Hynes, RSS 65). Yet despite mainstream caricatures of Carson as a woman without a man, she was hardly a hermit, rarely reclusive and certainly not solitary; indeed, she lived within a dense, closely knit society comprised of an involved extended family, several intimates, numerous associates, colleagues, and other sundry correspondents, most of whom were women.

Slowly, the images of Carson as an isolated loner are giving way to more compelling accounts of her dynamic social life and interaction with significant attachments. During her years of government work, Carson was regarded "as a fun-loving, party-going, sociable person with a mischievous sense of humor" (Bonta 266) whose only complaint "was that there was not enough time after work in her crowded household for her own writing" (Lear, "Rachel Carson's SS" 25). In addition to her mother and other family members, there were many relationships that Carson valued, that "influenced her work and gave shape to her life" (McCay 15-6). That Carson's life was organized around intimate relationships, that her scientific and aesthetic perspectives were informed by social interaction and care giving, and that the relationships that sustained her most were with women are fundamental concepts in my understanding of her writing. While there is increasing acknowledgement of such trends in Carson's life, the process of revision and reconstruction remains incomplete. Therefore, throughout this dissertation, I will combine details provided by biographers with historical information in order to assemble a consistent depiction of Carson's world

as well as a coherent context for her work. This depiction and context must accommodate the progressive and sometimes radical threads that flow through her writing, her science, her politics, and her life.

Scientists have been even more remiss than literary scholars and biographers, and their reluctance to seriously engage Carson's work is astounding, given the continued relevancy of the assertions she made in Silent Spring. In Living Downstream, Steingraber contemplates why so many questions concerning the connections between cancer and chemicals in the environment have been left unanswered, and why so much scientific inquiry into these issues is still considered "preliminary" 40 years after Silent Spring documented the problems (13). Despite the ban on DDT (which resulted from Carson's initiative), the national rate of pesticide use has doubled, and North American women born between 1947 and 1958 have close to three times the rates of breast cancer as their great grandmothers had when they were the same age (Steingraber 13). A Danish scientist has tracked high rates of sperm abnormalities along with a significant drop in sperm counts between the 1940s and the 1990s, while at the same time, observing the rate of testicular cancer triple (Colborn et al 9). In related findings, scientists in the Unites States have linked estrogen mimicking compounds in pesticides, like those identified by Carson, to "a 50% increase in the incidence of testicular cancer" (Wilson 44). There are many such studies conducted by individual or small groups of scientists, although their findings are isolated and ignored in much the same fashion as Carson and Silent Spring.

Carson predicted many of the frightening outcomes listed above and she proposed that problems resulting from the overuse of chemicals would be pernicious and persistent. As she suggested they would, insects are showing increased resistance to the chemicals that have washed over them since the mid-twentieth century. Fewer than twenty species of insects showed signs of pesticide resistance in 1950. By 1960,

Carson had identified 137 species "resistant to at least one pesticide" and by 1990, that number rose to 504 (Steingraber 152). Carson also imagined the consequences that would come from chemicals that are nearly indestructible. Recent reports have confirmed Carson's worst fears. For example,

> Of the 51 synthetic chemicals that have now been identified as hormone disrupters, at least half, including PCBs, are "persistent" products in that they resist natural processes of decay that render them harmless. These long-lived chemicals will be a legacy and a continuing hazard to the unborn for years, or in the case of some PCBs, several centuries. (Colborn et al 89)

For those who doubt the longevity of these chemicals, a recent study has revealed that while organic produce is less likely to contain pesticides, 23% of it does, and those are largely attributable "to organochlorides, including such long-banned substances as DDT" (*Organic Gardening* 12). Yet, as important as these issues are to environmental health and human well-being, they remain marginal and frequently contested in scientific, industrial, and government arenas.[10]

In Silent Spring, Carson forecasted (in great detail) many of the environmental crises we contend with today and she directly challenged arrogance in science, recklessness in industry, and indifference in government. As amazing as this record is, it reflects only a small portion of the interests and concerns that occupied her during her lifetime. According to Gartner,

> Carson never strayed far from her central focus, the interrelationships among human beings, their environment, and other living creatures. From the earliest articles and government pamphlets to Silent Spring and speeches of her final years, her work is all of a piece, with a consistent mission, method, meaning, and message. (110)

For me, the writing Carson produced prior to Silent Spring, particularly the three sea books, provide the most complete picture of her environmental consciousness, her philosophical commitments, and her personal perspectives. While Silent Spring is what she is remembered for (when she is remembered), it represents only a narrow understanding of her life's work. For most of her life and career, Carson was consumed by an enduring fascination with the sea and an equally abiding resolution to share what she found there. In addition, she enjoyed a close bond with her mother that was cooperative and collaborative and included a shared commitment to others and a deep love of the natural world. She was a woman-identified-woman who carried on many meaningful associations with other women. In addition, she was preoccupied with marginal worlds in ways that denied fixed and stable locations for her studies. Finally, she exhibited a love of science that included contribution and critique, as well as reform, and challenged ideologies of oppression that restricted the movements of women and others in society.

Carson's life in science began with a love of nature and that love was fostered by her mother. Along with many educated, middle class women of her generation, Maria Carson was an amateur naturalist who sustained a keen interest in natural history (Lear, WFN 13). She spent much time out of doors with each of her children, working through Hannah Botsford Comstock's Handbook of Nature Study, a curriculum designed to "put children in sympathy with nature" (Lear, WFN 14). Her mother was her first teacher, her mentor, and for most of her life, a partner in life. Maria "never harmed spiders and insects she found in their house, but carried them outside" to release them instead (Hynes, RSS 57), and by the time Carson was in high school, she "had embraced her mother's view that intellect and self-worth were far more important than material possessions or social recognition" (Lear, WFN 22). Maria wanted her daughter to become a writer, which was an acceptable role for women, and Carson followed this

path without question until she was introduced to Mary Scott Skinker and science as a student in college.[11] Although Carson was "[a]cutely aware of the financial implications of changing her major," Skinker turned her head from literature to science and "showed her that through the life sciences she might understand, rather than merely observe, the natural world" she loved (Lear, WFN 43). Carson's choice for science over writing was perhaps the first and probably one of the few rifts between mother and daughter, and it didn't last long.

Carson earned a Bachelor's degree in biology from the Pennsylvania Women's College, graduating magna cum laude, and a Master's in Marine Zoology from Johns Hopkins University. She remained at Johns Hopkins and began taking courses towards her doctorate, but "continued graduate education was beyond Carson's grasp; a luxury she could not afford during the depression" (Lear, "Rachel Carson's SS" 24-5). Carson had to turn to work outside of the academy and she hoped to be able to stay in science. Professional jobs for women scientists were almost nonexistent and after some reluctance on her part and much encouragement from Skinker, Carson turned to government service. Her first professional job outside of the academy was writing educational materials and government publications for Elmer Higgins of the U. S. Bureau of Fisheries, in the Division of Scientific Inquiry, then in the Department of Commerce (Gartner 110). Higgins was impressed with her background in science and her perseverance as a writer and in 1943 he gave her an opportunity to join his team writing radio scripts on marine life (McCay 12). The broadcasts were a great success and additional assignments were forthcoming, many of them demanding a focus on nutritional, financial, or recreational benefits available in the natural world (Gartner 114). For example, some of the pamphlets that Carson produced "encouraged housewives to buy unfamiliar local fish to help ease wartime food shortages, while others beautifully introduced national wildlife refuges" (Gartner 110). Much of her work reported on

research conducted on military exercises during World War II. One of Carson's articles highlighted "what scientists had learned about predation and how the various large fish and mammals were able to live together in a small contained habitat" (Lear, WFN 112). In addition to providing necessary income and the ability to work in a scientific capacity, Carson's work for the government exposed her to an incredible array of resources and helped her hone her skills as a researcher and writer.

With Higgins' encouragement, Carson "used her research for the radio scripts as a basis for several lengthy feature articles on various aspects of Chesapeake Bay marine life" (Lear, WFN 79). The articles, which appeared in the *Baltimore Sun's Sunday Magazine*, were concerned with the conservation of resources, respect for intricate ecosystems, and the effects of human intrusion on them. Carson communicated these themes for a general reading public using language that was engaging and accessible, but did not dilute the scientific content. According to Lear, "by the eloquence of her prose and rigor of her synthesis, [Carson] educated the public and made the life sciences a vehicle for understanding complex technology" (WFN 23). In this way, Carson continued a trend that had emerged towards the end of the nineteenth century when women, as mothers and keepers of the hearth, became scientific investigators in order to educate children about important issues related to the health of both human and natural environments.[12]

As science and technology evolved during the nineteenth century, they gained social currency and became less of a vocation for women in the home, and more of a profession for educated men in institutional and industrial settings. This transference had many grave implications and, according to Barbara Gates and Ann Shteir in their volume, Natural Eloquence: Women Reinscribe Science, "the Scientific Mother was edged out by men of science who seem to have appropriated the gaze as well as the words of women" (10). By the early and mid-twentieth century, the central role played by

women abated and became secondary and supportive to men and their work. Frequently, women who continued in science communicated information gleaned from scientists (who were otherwise occupied doing the "real" work of science). According to Norwood, Carson was like most women in government work who were tracked into jobs reflecting expected gender roles. For example,

> women in Fish and Wildlife reported on progress in knowledge and served as conduits between government and the public for explaining and encouraging support of various conservation efforts. (Norwood 166)

Even so, while Carson was subject to many of the trends affecting women scientists in government service, the articles she produced during her tenure "reflected the research of a thoroughly competent marine biologist familiar with the population and habitat studies" of the region (Lear, WFN 79). Such acuity would distinguish all of the writing she would produce for the government and later.

Social forces certainly affect the demographics of scientific institutions and they likewise shape the contours and ideology of science. Early work by feminists on the topic of science has been limited to historical re-visions and political critiques. In her essay, "Feminist Scholarship in the Sciences: Where Are We Now and When Can We Expect a Theoretical Breakthrough?" Sue Rosser claims that feminists have only recently begun "to raise questions of whether or not women do science differently from men" (8). Ten years after Rosser wrote that, such questions have remained largely unexamined, leading Eloise Buker to charge that "second-wave feminist scholars, hesitant to take on scientific authority," have left it to its own devices for far too long (106).[13]

Carson was not afraid to take science on, even in the earliest examples of her writing. Perhaps it was easier for her because didn't always make her case directly, because she was generally not adversarial, and because such critiques were only part of

her mission. Her time and energies were split among two demanding careers as well as a highly involved personal life. She walked in different worlds and also between them. She was in many ways, a border crosser, a transgressor, an interloper. Carson exceeded the limits of expectation in every role she assumed. She was a woman and a scientist, but because "science is considered a masculine pursuit in our culture, science [. . .] done by women is often defined as non-science" (Rosser 8). According to Adrienne Rich, no woman can be an insider in institutions fathered by masculine consciousness (D. Freedman 5). Carson's case was additionally complicated because she was employed as a scientist during a time when professional women faced escalating restrictions in the workplace (Norwood 150) and were increasingly encouraged to leave. According to Margaret Rossiter in her comprehensive study, Women Scientists in America Before Affirmative Action, 1940-1972, while the years after World War II have been called a golden age for science in America, the same time "has generally been considered a very dark age for women in the professions" (1). Even so, Carson's participation in the culture of science is beyond dispute, and I will detail it thoroughly in chapter five, "Science, Sisters, and the Sea: Rachel Carson and her Refusal to be Silent on Matters of Science in the Sea Books."

In addition to being a woman and a scientist, Carson was a scientist and a writer. The strain between science and the humanities is a very old ache indeed, one that has been documented explicitly and one that Carson most certainly observed.[14] A poetic and apt description of the schism between the two appears in Virginia Woolf's Orlando when Orlando plays at being an amateur naturalist and quickly discovers that "[g]reen in nature is one thing, green in literature another. Nature and letters seem to have a natural antipathy; bring them together and they tear each other to pieces" (17). The antipathy that Woolf describes was a familiar and persistent conflict for Carson and I will return to it again in the chapters ahead. Her authority as a scientist was compromised

by her gender and her credibility was scrutinized because she dared write for a popular audience. Carson was further suspect because she "began publicly questioning the direction and results of scientific research near the height of the McCarthy era" (Lear, "Rachel Carson's SS" 34). Even though she would suffer the consequences of these erroneous associations and many more manifestations of ideologies of oppression throughout her career, most would follow the publication of Silent Spring and none of them would prevent her from challenging science and scientific institutions.

The climate for women in the sciences became chilly at the same time broader trends worked to limit women's access to public discourse and restrict their social mobility. By the 1950s, conservative attitudes toward women's sexual and social identity in general, and lesbianism in particular, were manifest in all aspects of American culture (Adams 256). These attitudes must have affected Carson, whose "entire life was marked by creative and enduring friendships with women" (Hynes, RSS 61), although the conservative climate didn't dissuade or deter her preferences. Indeed, Carson continued to organize her life around significant relationships with women, enjoyed a long-time loving affair with Skinker, and left volumes of stirringly romantic correspondence between herself and Dorothy Freeman that document "the two women's lesbian passion and commitment" (Gage 10).[15] Sexist and homophobic attitudes impacted the direction of Carson's life and the opportunities that were available to her, and these attitudes continue to shape biographical portraits and scholarship on her work as well. Of all of the conditions of Carson's life that have been glossed over by scholars, identification of her as a woman-identified-woman and lesbian are the most frequently contested and routinely obliterated.

My understanding of Carson's writing benefited enormously when I recognized the extent to which her personal life informed her work, and it was enhanced further by an acknowledgement of the primary place of women in her life. But Carson was more

than a lover of women, and my reading of her work was enriched that much more when I realized that she lived as a lesbian. In fact, I assert in chapter three that Carson created a lesbian narrative space to share with her readers in the sea books. For reasons that should be apparent (and will be addressed in more detail in the chapters ahead), it was an identity that she could not claim openly, even though it informed her work in amazing ways. To my modern feminist eyes, all the signs were there, although biographers have consistently averted their eyes or denied what they saw. Even Lear—who confessed that her purpose in writing the most comprehensive biography on Carson yet, was to set the record on Carson straight, and who provides plenty of curvy, suggestive details in that biography (which I mine heavily and directly)—even she was reluctant to speculate on Carson's sexual orientation.[16] Perhaps it was a strategic decision in response to the same homophobic and heterosexist valences that kept Carson in the closet, although it is lack of commitment that has the unfortunate consequence of perpetuating those same attitudes in addition to broad misconceptions about Carson herself.

Carson wore many hats and changed them frequently. She was a scientist, an artist, a lover of nature, a lover of women. She belongs to and expands a number of significant traditions, some more visible than others, including the history of women in science, of women nature writers, of popularizers of science, as well as hidden histories of lesbian existence. For Gartner, these were not separate identities for Carson. Rather,

> Just as one concept of ecological interrelationships was a cornerstone of her philosophy, so her organizing principle was integration: of interest and activities, occupation and recreation, science and poetry, subject and structure, facts and message. (124)

Perhaps then, the most appropriate theories to look at a person such as Carson are those that intersect with a "multiplicity of other theories" (Buker 3).[17] Writers who

traverse boundaries in their lives and promote border crossing in their writing exhibit similar strategies in negotiating access to public discourse. These groups, whether affiliated by ethnicity, gender, sexual orientation, class, age, or physical ability, or other factors, may have distinct political identities and agendas, but nevertheless respond to dominant ideologies in similar ways.[18] Carson's study of the sea and the lens, or perhaps more accurately, the filter through which she experiences it, and the language she uses to imagine, interpret, and describe it emerge from a perspective that is decidedly "other," and sometimes doubly or triply so.

In An Alchemy of Genres: Cross-Genre Writing by American Feminist Poet-Critics, Diane Freedman describes poetic prose as "an amalgam of genres, a crossing of various borders, [that] may enable women to abandon patriarchal discourse for a discourse of unbounded fecundity" (46). Regarding Carson's work, critics have tended to isolate Silent Spring from the sea books and deal with each book separately and consecutively rather than imagining ways that her books might interrelate. Producing individual works that relate to each other in ways other than narrative continuity is a strategy sometimes used by writers who come from backgrounds where self-identity is closely linked with community and, in some cases, where distinctions between self and community are indistinguishable or simply irrelevant.[19] For example, Louise Erdrich's quartet of novels (Tracks, Love Medicine, The Beet Queen, and Bingo Palace) correspond to the elements, earth, fire, wind, and water. Making connections between the novels reinforces an appreciation of connection and continuity that is contained within them. As another example, Maxine Hong Kingston's auto/biographies Woman Warrior and China Man break all the rules in these conventionally non-fiction categories. In Woman Warrior, Kingston's "memoirs of a girlhood among ghosts," intimate and personal stories of her mother and her mother's ancestors (the women) are used to communicate the realities of her own life and identity. Kingston partners that book with

the epic stories of adversity and adventure faced by her father and his relations (the men) in China Men. Thus, Kingston reinforces interconnectedness by intricately layering relations, some distant, some close, sometimes coming together and at other times falling away, in books both separate and joined, and all united in informing her identity and her perspective.

Each of Carson's four major works stands alone as unique and distinct, and as already mentioned, scholars tend to separate the sea books from Silent Spring as well as from each other. For example, McCay groups the sea books together and sets them apart from Silent Spring when she claims that,

> All of [Carson's] books about the sea play variations on the same theme: nature is a delicate series of interconnections that over the millennia, prior to human intervention, have created a perfect synthesis. In Silent Spring Carson shifts her focus precisely to that human intervention. (70-1)

Although McCay acknowledges the thematic links between Carson's four books, the difference she locates is only that between Silent Spring and what came before. Whether divided into two groups (the sea books and Silent Spring) or grouped together, the four books are typically considered chronologically and represent the development of Carson's ecological philosophy and its culmination in Silent Spring. Carson's books are seen as progressive, forming "a developmental thematic sequence reflecting her growing sense of ecological relationships and increasing foreboding at the effect of our destruction of the natural world" (Gartner 3). In one sense, it is true that the sea books laid a foundation for Silent Spring, but most notably because their popularity attracted a large audience worldwide and made it difficult for critics to dismiss Silent Spring (McCay 81). Even so, positioning Silent Spring as the pinnacle or even simply the sum of Carson's work distorts the cycles of continuity and interconnectedness she so vigilantly promotes, fails to consider aspects *not* directly related to the production of Silent Spring,

limits the possibilities for relating to the sea books as distinct from Silent Spring, and ignores the ways in which her work functions together as a whole.

To redress what has become a serious impediment in scholarship of Carson's work, I will introduce each of the sea books in this chapter and henceforth include consideration of them together in the chapters that follow. But first, some words of explanation and acknowledgement. Most of the themes that I address are represented in each of the sea books, although some themes are more pronounced in one book over the others. For example, because The Sea Around Us benefited most obviously from advances in science and technology following World War II, it figures prominently in my chapter five on Carson and science. On the other hand, The Edge of the Sea is most frequently cited in my chapter four ("Living on the Edge: Locating the Other in Rachel Carson's Three Studies of Shores and Seas"), because from title to appendix, it is the most preoccupied with borders and zones, border crossing, and ambiguities between borders (all primary considerations of that chapter). A final factor influencing the distribution of citations in the chapters ahead results from differences in the length of each of Carson's books. The Edge of the Sea is the longest book and Under the Sea-Wind is by far the shortest, so differences in the use and allocation of passages of each book is reflected proportionally.

Because my discussion of the sea books is framed by considerations of particular issues, themes, and critical perspectives, rather than confined to individual books, it makes sense to outline my own chapters prior to introducing Under the Sea-Wind, The Sea Around Us, and The Edge of the Sea. In addition, as may be apparent by now, I cannot rely on readers' assumptions regarding Carson's life or her work. Therefore, each of my chapters contains varying degrees of biographical and historical details to establish a shared context. Chapters two and three contain a lot of personal details along with feminist literary analysis, while chapters four and five rely on the

biographical information provided in previous chapters as a foundation to strengthen feminist and ecofeminist assessments of her work. Chapter five also includes consideration of traditions to which Carson belongs, such as the history of women in science. In addition, although I have labored to achieve coherence and continuity in the presentation of my ideas, there are several issues that will float in and out of chapters, including consideration of domestic metaphors and issues of binaries, dualities, and ambiguities. I devote an entire chapter to science, yet science is present in every chapter. Similarly, although I describe Carson's location as a lesbian in detail in chapter three, it is an identification that should be understood throughout.

Coverage of my chapters is meant to be suggestive rather than comprehensive and begins with chapter two, "Mother, Sea, and Material Immortality." In that chapter, I address aspects of Carson's home and domestic life as they have contributed to issues and values she expressed in her writing. For example, Carson's vast experience as a caregiver informed the development of an ethic of caring that is communicated throughout the sea books. The powerful partnership she shared with her mother similarly informed her ideas, evidenced in her articulation of material immortality, the cycles by which (mostly) elemental materials remain in constant circulation. Finally, though I argue in chapter two that Carson's work was shaped by strictly enforced gender roles and rigid ideologies, her response to those restrictions was to promote affective characteristics and behaviors while divesting them of gender innuendo. In chapter three, "Parting Fronds and Probing Fingers: Rachel Carson Takes her Love to the Sea," I show the ways in which Carson's perspectives as a woman-identified-woman and lesbian are manifested in her life and in the sea books. For example, Carson employed coding strategies to cloak her sexual orientation as well as to shield her promotion of progressive, radical, and even seditious observations, values, and ideas. Interestingly, both tactics are signaled by a savvy attention to dress and disguise. Specifically, I

believe Carson used her body as a blank canvas on which she applied appropriately gendered trappings, sufficient for her to pass through public life with a lessened threat of sanction. In the sea books, Carson shows the success of disguise and camouflage as strategies to enhance survival in the natural world.

Chapter four, "Living on the Edge: Locating the Other in Rachel Carson's Three Studies of Shores and Seas," is devoted entirely to literary analysis, ecofeminism, and feminist engagements with theories of identity. I find Carson's consistent preoccupation with border and zones, marginal landscapes, border crossings, and blurred boundaries incredibly provocative, as they anticipate attitudes and theories explored by feminists a generation after her death. Because Carson was absorbed in the natural world and because the subjects she identifies are non-human (whether living being or landscape), the application of ecofeminist literary criticism is most edifying. Ecofeminist theory also figures into chapter five, "Science, Sisters, and the Sea: Rachel Carson and her Refusal to be Silent on Matters of Science in the Sea Books," when I turn finally to a consideration of Carson's work as a scientist and her engagements with scientific ideology, epistemologies, and institutions. There, I assert that Carson's critique of science was a vigorous charge throughout the sea books. However, unlike the criticism apparent in Silent Spring, Carson offers alternative models of scientific inquiry in order to enhance and advance science.

Now, for the remainder of this chapter, I will turn to an introduction of each of the sea books, including an overview of their content as well as brief surrounding context. Under the Sea-Wind was Carson's favorite book and perhaps the "best natural history of the ocean" (Lear, "Rachel Carson's SS" 25). In it, her "gifts as a writer and as a scientist most perfectly come together" (Gartner 46). Carson was a meticulous writer and her research was exhaustive—she "consulted over a thousand sources and conferred or corresponded with experts all over the world" (Gartner 51). The result is a work of

"rigorous scientific accuracy and thoroughness undiminished by the poetry of word pictures and building rhythms" where "Carson weaves three interlocking narratives portraying the life of the waters near the shore, the open sea, and the sea bottom" (Gartner 29). Each of these habitats contains spiraling cycles of relationships. According to Raglon, nature writers like Carson "tend to see the world primarily as a home for other subjects rather than merely as a storehouse filled with resources for human consumption" (198).[20] Furthermore, she was an ecologist and, therefore, relied on metaphors of households or homes in her descriptions of the natural world (Norwood 151). Issues of home are inseparably linked with domesticity, and they, in turn, evoke a host of tantalizing topics for feminist inquiry. Many of these topics will be covered in chapters two and three.

Under the Sea-Wind is loosely divided into three sections, referred to as "books," and each section is further sub-divided into chapters. The first section, "Edge of the Sea," includes tales of interlopers, those beings who pass between land and sea such as sanderlings, heron, a snow owl, running shad, ghost crabs, and other creatures of the coast. "Book Two," is organized around creatures of the sea, followed by the third section which returns to border crossers. In the second section, "The Gull's Way," Carson follows Scomber, the mackerel from egg to adult as he travels from inlet to open sea and in "Book Three," "River and Sea" she traces the journey of female eels from their river homes to the deep salt sea. Like all of Carson's writing, Under the Sea-Wind contains a powerful emphasis on relationships between various creatures and between beings and the material elements they encounter in their environments. In addition, there are strong waves of movement in Under the Sea-Wind. According to McCay,

> [Under the Sea-Wind is] a narrative of the lives of birds and fish as they travel in their peculiar migratory patterns. Driven by instincts that

> scientists have yet to understand fully, the animals of the sea and air are locked in timeless rituals that have the sea as their stage [. . .] (26)

With stories of dancing sanderlings, circling shrimp, and sojourning eels, Carson links interconnection with the eternal cycles of life. Though it has the fewest number of pages among the sea books, Under the Sea-Wind is the most narrative and contains many of the themes that would be evident in later books, including prominent examples of material immortality. For example, Carson describes a ghost crab scurrying along the shore. Startled by a passerby,

> he dashed into the surf, preferring this refuge to flight. But a large channel bass was lurking near by, and in a twinkling the crab was seized and eaten. Later in the same day, the bass was attacked by sharks and what was left of it was cast up by the tide onto the sand. There the beach fleas, scavengers of the shore, swarmed over it and devoured it. (UTSW 36)

When the next wandering ghost crab noshes on those beach fleas, the circuit will be complete. This passage is a nice, concise example of material immortality, and there are plenty more in Under the Sea-Wind.

Though sensory perception is a topic covered in my chapter four, there are many examples of Carson's privileging senses other than sight in Under the Sea-Wind. She provides a sonorous example of the exchanges between sound and silence that mark the deep sea when she explains that generally, it is a place of silence, except when the wind whispers over vast sheets of water, or when sea gulls riding the wind let loose their high, wild mewing, or when whales break the surface to expel a long-held breath before rolling again back into the sea (UTSW 117). The structure of Under the Sea-Wind is steady and consistent, and the descriptions, like that of the deep sea, can be mesmerizing. For Gartner, Carson "united form, content, and style to make [Under the

Sea-Wind] her most successful literary work" (29), although that success would not be enjoyed until much later. Due to the unfortunate timing of its original publication, Under the Sea-Wind was not a commercial success in late 1941 because the attack on Pearl Harbor overshadowed its reception by the public. Even so, it was well received by critics and earned Carson recognition from other naturalists. William Beebe included excerpts of Under the Sea-Wind in his collection of the "world's best nature writing," The Book of Naturalists (Bonta 265).[21] Furthermore, attention to her work "led to a more comprehensive study of the oceans" (Norwood 150) and great anticipation for her next book.

All but those closest to Carson would wait for ten years before the appearance of her next book.[22] Like all of her work, The Sea Around Us was produced under the most trying of personal circumstances.[23] According to one biographer, "[w]ith the war, Carson's own demanding work, and family responsibilities, the book was literally a decade in the making," although the "actual writing probably took little more than three years" (McCay 40). In addition to the hurdles Carson faced in her life, she frequently challenged herself as a writer. For example, she imagined the widest audience possible for The Sea Around Us and according to Lear,

> Carson's objective was at one with her vision of her life's mission. She would educate and awaken as well as fascinate. She would tell the story of the intricate relationships between the life of the sea and the life of the land. Her focus would be on the long history of the ocean, revealing its beauty and its mystery. (WFN 163)

For McCay, Carson's ultimate goal was to portray the life of the sea in words nontechnical readers would understand" (41). Where Under the Sea-Wind is narrative, The Sea Around Us is expository (Gartner 3) and that exposition is shaped overtly by scientific information and methodology. Put another way, Carson enters the sea with the

lens and language of science in The Sea Around Us. She incorporated many traditional scientific trappings such as charts and graphs in place of the captivating illustrations in Under the Sea-Wind, and instead of the glossary at the end of Under the Sea-Wind, she includes a list of additional readings in The Sea Around Us.

In the preface of the 1961 edition of The Sea Around Us, Carson acknowledged that the "awakening of active interest in the exploration of the sea came during the Second World War, when it became clear that our knowledge of the ocean was dangerously inadequate" (TSAU vii). While many have commented that The Sea Around Us benefited from the scientific research conducted during the war, Carson shows how much of that research was directed by commercial interests. For example, Carson notes that "[o]f all legacies of the ancient seas the most valuable is petroleum" (TSAU 193), "[o]f all the elements present in the sea, probably none has stirred men's dreams more than gold" (TSAU 188), and "[o]f all the parts of the sea, the continental shelves are perhaps most directly important to man as a source of material things" (TSAU 59). In these passages, Carson makes clear the connection between scientific and capital gains, undermining the notion of science's supposed objectivity, neutrality, and seeming indifference to such matters. In "Wealth from the Salt Seas," she writes,

> Thanks to modern methods of commercial production of bromine we have high-test gasoline for our cars. There is a long list of other uses, including the manufacture of sedatives, fire extinguishers, photographic chemicals, dyestuffs, and chemical warfare materials. (TSAU 189)

Carson seems dispassionate as she lists resources harvested from the sea, although she did not intend The Sea Around Us to "neglect the destruction that the human species had brought to the planet in its brief tenure here" (Lear, WFN 163). Here, it is interesting to note that much of Carson's critique of man is communicated through stories of scientists. Astronomers, botanists, biologists, ornithologists, even

naturalists—frequently referred to by name—injure and violate as they explore in the name of science. They introduce invasive species and trounce across fragile landscapes. It is also in The Sea Around Us that Carson launches some of her earliest critiques of science which I'll return to in chapter five.

In The Sea Around Us as in Under the Sea-Wind, Carson is chiefly concerned with relationships, interdependence, and movement, although she introduces additional ripples. Lovely, intimate portraits of discrete cycles in Under the Sea-Wind give way to wide, endlessly spirally systems in The Sea Around Us. Relationships are presented within the context of communities and those communities ultimately reveal cycles of social interdependence that are lush and layered. Suggesting that all life in the sea is linked, Carson notes patterns of delicately adjusted, interlocking relationships in the surface waters. She explains that,

> [w]hat 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. (TSAU 19)

The cycles of cause and effect and interrelatedness between individual animals above, expand into relative atmospheric and geologic cycles below. Raglon observes that in The Sea Around Us, "Carson is drawn to cycles so vast they cannot be perceived by human senses, but must be imagined" (203), yet Carson is careful to provide a point of reference for her readers to relate to events outside of their perceptual experience. For example, she explains the cumulative affect of material falling to the deep ocean floor in increments, so "little in a year, or in a human lifetime, but so enormous an amount in the life of earth and sea" (TSAU 75-6). Similarly, Carson presents the great glaciers as waves, and explains,

> the sea ebbs and flows in these grander tides of earth, whose stages are measurable not in hours but millennia—tides so vast they are invisible and uncomprehended by the senses of man. Their ultimate cause, should it ever be discovered, may be found to be deep within the fiery center of the earth, or it may lie somewhere in the dark spaces of the universe. (TSAU 107)

Above, Carson reconciles an interesting paradox and exposes the breadth of cycles that challenge human perception. Carson also reminds readers that wondering "patiently why man is not a constant witness [. . .] is to fail to understand the majestic pace" of such processes (TSAU 90). Even when these cycles are on-going and perpetual, they may be invisible to human senses, as in the case of cyclic salt which is "picked up by the winds from the spray of a rough, cresting sea or breaking surf and is blown inland, then brought down in rain and returned by rivers to the ocean" (TSAU 187). For Carson, limitations of human senses and human experience prohibit unmediated access to the natural world even though humans are not separate from the cycles of nature.

Carson reconnects humans to the natural world with stories that link past to present. For example, she cites evidence in folklore and written records that indicate early navigators carried birds with them during their oceanic voyages. Then, at their discretion, these primitive sailors could release the birds and follow them to shore (TSAU 208). Furthermore, some 50 million year ago:

> immense numbers of a large protozoan known as nummulites swarmed in this sea and each, in death, contributed to the building of a thick layer of nummulitic limestone. Eons later, the ancient Egyptians were to carve their Sphinx from a mass of this rock; other deposits of the same stone they quarried to obtain material to build their pyramids. (TSAU 100)

Even though man has a rather loathsome record and despite the damage that has been done, Carson proposes a healing process involving reattachment and recollection. She explains that although mistakes have been made in the past, "in modern times, at least, we might profit by history" (TSAU 95). In other words, knowledge gleaned from the past offers equal measure of hope for the future whether from stories told and retold for generations, or from the analysis of data gathered from the earth with scientific instruments.

Recent feminist critics have noted that scientists may initiate social change when they utilize narrative strategies to communicate scientific information, because details "set into a narrative enable readers to understand them in personal terms and thereby inspire action" (Buker 94). Carson demonstrated this strategy successfully in Silent Spring, and in the sea books, as well.[24] In spite of her faith in the power of narrative to inform, educate and motivate, Carson recognized that knowledge is always incomplete and contestable. Questions cannot be answered with finality, as when she reports "we know only enough to want to know more" (TSAU 207). Stories can help to fill gaps in knowledge left vacant by science and human limitations, and Carson uses such moments to press readers to garner a tolerance for ambiguity. She acknowledges that the "deep, dark waters, with all their mysteries and their unsolved problems, cover a very considerable part of the earth" (TSAU 37) and confesses again and again that there is much we do not know.

Narrative techniques are similarly useful to communicate scientific information and to bridge gaps in knowledge. For example, Carson uses the metaphor of a long snowfall to describe the elemental bits of debris that fall on the deep ocean floor like snowflakes. She joins this metaphor with another when she describes the flakes drifting down as "writing their unequivocal record," and wonders "[w]ho will read their record, ten thousand years from now?" (TSAU 82). For Carson, life on earth is a shared journey,

signaled by inclusive pronouns, both implied and direct. She explains that beyond the continental shelf are the "steeper declivities of the continental slope" and it is in those regions that "we begin to feel the mystery and the alien quality of the deep sea" (TSAU 60). Thus, Carson introduces mystery and ambiguity into the web of life and grounds an unfamiliar environment in the comforts of familiar narrative techniques and experiences. It is no wonder that readers of The Sea Around Us found it less "an escape from contemporary anxiety, than a perspective that inspired and reassured" (Lear, WFN 205).

Prior to publication, William Shawn, then editor-in-chief of *The New Yorker* was sent a manuscript of The Sea Around Us. He responded enthusiastically, and recognized immediately that Carson was a writer with serious talent. Stoking pre-publication anticipation, he "caused a literary stir by publishing it serially as a *New Yorker* 'Profile,' the first ever about a non-human subject" (Lear, WFN 198).[25] After publication, "[l]iterary critics, scientists and ordinary readers alike were surprised by Carson's ability to master such comprehensive information and to present a balanced picture with such lean yet poetic language" (Lear, WFN 203). The Sea Around Us was a huge success and soon "Carson became the country's most famous female naturalist" (Norwood 147). More importantly, her popularity finally paid off and she was able to quit her government job in order to devote herself to writing full time.

The time Carson gained when she left government service was quickly consumed by onslaughts of exciting and extraneous projects. Care giving responsibilities within her household increased rather than diminished. Her own health began to falter during these years and between complications resulting from her mother's steadily advancing age, and the general needs and incidental infirmities of others under her care, Carson would struggle to find time for research and writing even without full-time employment. In addition, Carson's network of colleagues, associates, and intimates grew significantly during the years after she left government service, providing, as

relationships frequently do, both enrichment and taxation.[26] Nevertheless, she persevered and as time passed, she became more and more drawn to the life of the sea (McCay 53). With unaccustomed latitude and freedom, Carson was able to follow her heart and pursue the matters most meaningful to her, at least in her writing.

Coincidentally, the book that resulted from these pursuits is the book that introduced me to the wonderful world of Rachel Carson and it remains my favorite to this day (although it is a very close race with the others). Intimate, poetic, inviting, and accessible, yet not without friction and conflict—it is all that I love in literature. Full of rich ambiguities and complexities, The Edge of the Sea was more than the seashore guide her publishers had asked Carson to write; it was a comprehensive "study of ecological zones between tide lines" (Gartner 18), and there is infinite variety in the relationships she describes. In the passage below, Carson focuses on the seam where land and sea live together:

> From the edge of the spruce forest down to the dark groves of the kelps, the life of the land grades into the life of the sea, perhaps with less abruptness than one would expect, for by various little interlacing ties the ancient unity of the two is made clear. (TETS 46)

The coastal environment provides particularly compelling examples of the connections between living things and between living things and their habitats. For Gartner, the organizational strategy in The Edge of the Sea is neither geographically consecutive nor chronological but moves thematically through association; this is a departure from most books of natural history which are based on journeys (82). It is however, an approach consistent with Carson's earlier work.

In The Edge of the Sea, the shore is not merely "a world that keeps alive the sense of continuing creation and of the relentless drive of life," but also a place to sense the "intricate fabric of life by which one creature is linked with another, and each with its

surroundings" (TETS 2). As in the first two sea books, Carson focuses on interconnectedness and highlights strong attachments to communities. For example, basket stars "are not only abundant but associate in herds of many individuals as though for a common purpose" (TETS 227), and the mussels that live in intimate association with the great, red seaweed, Gigartia are united "inseparably to form a tough mat" (TETS 92). These communities can be incredibly crowded and complicated, like those among coral reefs. In addition to the corals, there are thousands of plants and animals in residence, including "colonies of tube building worms," "mollusks of the snail tribe whose contorted, tubular shells may be intertwined into massive structures," as well as calcareous algae that "add their substance at death to the coral sand of which limestone rock is later formed" (TETS 199). In The Edge of the Sea, all possible relationships between things are described and explored: there are those like the mussels and the seaweed, that live in conjunction with other living things; there are those, as found among coral colonies that live on other living things; and there are even those, as seen on communities of life in and around sponges, that live in other living things.[27] For Carson, meaningful connections are more than associations among like kinds, but to all kinds. Partnerships and communities are diverse and integrated, created not by accident, but because being together enhances both quality of life and the chances of survival for all.

Carson presents relationships and communities in context so that the significance of attachment is made clear. In "Patterns of Shore Life," she admits that "[n]owhere on the shore is the relation of a creature to its surroundings a matter of single cause and effect" (TETS 14). Rather, "each living thing is bound to its world by many threads, weaving the intricate design of the fabric of life" (TETS 14), and later, for the fauna that makes its home on kelp, she claims "the survival of the kelp is their survival. While it stands firm their little world holds intact; if it is torn away in a surge of stormy

seas, all will be scattered and many will perish with it" (TETS 65). All living things share the common bond of living in a world of unconcerned organic elements and regular and relentless, sometimes catastrophic collisions with atmospheric cycles. Carson describes the shore "with its difficult and changing conditions" as a "testing ground in which the precise and perfect adaptation to environment is an indispensable condition of survival" (TETS 11). Communities are not completely free of risk either, and Carson does not shy away from reporting brutal realities. She notes that, "[a]long with those that build are others that destroy" (TETS 199) and although a reef flat during the day "seems quiescent—a dream world inhabited by creatures that move sluggishly or not at all," when the day ends, the world becomes "full of tensions and alarms" because at night, "hunter and hunted are abroad" (TETS 238). As water seeks it own level and equilibrium is achieved, there is a balanced exchange between passive and active agents, predator and prey, and might and day in the passage above.

In The Edge of the Sea, Carson wanted "to show the way in which all the shore species were a part of a force at once creative and destructive, powerful and vulnerable, but never random" (McCay x). For coastal creatures that face the open Atlantic, "[e]ach wave breaking on the beach is at once their friend and enemy; though it brings food, it threatens to carry them out to sea in its swirling backwash" (TETS 153). At Cape Lookout, while tidal currents swirl over or around its shoals, their contours may gradually change. She explains that some of their substance might be borrowed by the waves one day, to be repaid with sand or silt brought from other areas on another. Despite the constant change, Carson concludes that the shoals "are on the whole a stable and peaceful world for the animals of the sands" (TETS 145-6). In such areas, there is often a delicate balance between constancy and the change inherent in continuity. Indeed, according to Gartner, Carson's "most important controlling theme is the concept of the earth as an ecologically balanced, interlocking whole where nothing is wasted" (60). In

another manifestation of material immortality, Carson explains that living beings have an important role in maintaining that balance as when she describes the necessary function performed by ghost crabs on the beach:

> [Ghost crabs] gnaw at bits of sea lettuce or eelgrass or kelp, their bodies swaying with the vigor of their chewing. In the litter of the tide lines they find morsels of dead fish or crab shells containing remnants of flesh; so the beach is cleaned and the phosphates, nitrates, and other mineral substances are recovered from the dead for use by the living. (TETS 162)

In the economy of the sea, plants and animals are important "links in the living chains by which materials are taken from the sea, passed from one to another, returned to the sea, borrowed again" (TETS 221). They are more than passive recipients of organic materials passed to them via the food chain; rather, they are active participants in the world around them.

What resonates most powerfully for me in The Edge of the Sea, and what I find most appealing, is how much room there is for Rachel as an interactive subject. For the first time, Carson's "I" appears in her writing when she reports the following recollections: "I have gone down into my own rockweed forests on the summer low tides to search for [periwinkles]" (TETS 84); "I have watched the worms at work, in a miniature world of sand and sea created for them in my laboratory" (TETS 145); and,

> I have walked these beaches in the biting wind that lingers after a northwest storm, with the waves jagged on the horizon and the ocean a cold leaden hue, and have been stirred by the sight of masses of the bright orange tree sponge lying on the beach, by smaller pieces of other sponges, green and red and yellow, [. . .] by sea squirts like knobby old potatoes, and by living pearl oysters [. . .]. Once there was an octopus in distress on the wet sands where the waves had thrown it. But life was

> still in it; when I helped it out beyond the breakers it darted away. (TETS 175-6)

Carson invites readers to join her on "my own shore in Maine" (TETS 79) and shares observations from her own intimate explorations in beautiful, vibrant prose. These observations communicate as much about Carson's philosophical base as more explicit statements, although she includes those, too. Though many of these passages involve passive observation, Carson does not separate herself from the natural world. Instead, she demonstrates an ethic of caring by mindfully returning the stranded octopus to its home in the sea.

That The Edge of the Sea is personal and poetic makes it no less scientific; rather Carson expands and enhances the scope of scientific inquiry to accommodate her engagement with the natural world. There are maps, but no charts or graphs, although like Under the Sea-Wind, The Edge of the Sea contains attractive and accurate artwork by Bob Hines. Illustrations weave in and out of narrative blocks, sometimes webbing an entire page of text. For the first time, illustrations are coupled with captions containing descriptive or identifying information. They are informal, informative, incomplete and read like field notes. Next to one detailed image, a caption reads: "Loggerhead sponge with spiny lobster and long-spined black sea urchin. Young urchin has white bands on spines" (TETS 217).[28] These captions supplement, rather than repeat information contained within the narrative. Finally, instead of a glossary or bibliography, The Edge of the Sea has an appendix of classification where each being's lineage is mapped out like a tree with branches of history, familial traits, and an inventory of close and sometimes distant relations. Individual animals are cross-referenced under both their Latin and common names.

According to Bonta, writing The Edge of the Sea was a gratifying and joyful experience for Carson (269). It is surely the most sublime and meditative of the sea

books, and it shares the least in common with Silent Spring. Perhaps it is this difference that has caused many scholars to avoid it. The scholarship that does exists is mixed and uneven.[29] After it was first published, The Edge of the Sea became a bestseller that reviewers praised for "scientific accuracy, thoroughgoing curiosity about and reverence for the sea, and [Carson's] ability to make science into poetry" (McCay 59). According to Lear, acclaim for The Edge of the Sea proved that Carson "was no ephemeral star on the literary horizon but a writer to be reckoned with now and in the future" (WFN 274). Shortly thereafter, Carson became known as "one of the world's most beloved writers of science and natural history" (Lear, "Rachel Carson's SS" 27). It is this portrait of Carson as an adored, cherished, respected, and valued woman that I imagine. And, it is this Carson who is the subject of my dissertation, not the rankled, sinister spinster that adversaries of Silent Spring would soon make of her.[30] In the chapters ahead, I want to introduce you to Rachel Carson and the sea books as I have come to know them.

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1 According to Emily Wilson, in 1962, "President John F. Kennedy told reporters at his weekly press conference that he and his cabinet were learning a great deal from 'Miss Carson'" and congressional committees "invited her to meet with them to consider what action should be taken to correct the problems she had described so vividly" (Wilson 41).

2 According to Lear, Wilhelm C. Hueper was with the National Cancer Institute and "one of the foremost authorities on environmental cancer" (Lear, WFN 332). Along with Morton Biskind, toxicologist and nutritionist and Malcolm Hargraves a hematologist with the Mayo Clinic (Lear, WFN 320), Hueper was a pioneer in making the connection between pesticides and cancer (Lear, WFN 356-7). He provided invaluable support for Carson's work as well as her mission, and contributed significantly to her research. Later he would remember Carson as "a sincere, unusually well informed scientist possessing not only an unusual degree of social responsibility but also having the courage and ability to express and fight for her convictions and principles" (Lear, WFN 356)

3 I am unhappy, though resigned, to introduce women who were significant in Carson's life in footnotes. However, I would like to share with readers what a difficult decision it was to make and explain the challenges of conceptualizing and organizing this project. Background information that I would like readers to take for granted cannot be assumed, and it is not possible to reconstruct Carson's life without somehow reconstituting an entire cast of characters who are now all but invisible. It is thus an uncomfortable compromise to give even the appearance of burying details of these lives and relationships in footnotes. Nevertheless, there are restrictions to this form and I ask readers to imagine my footnotes throughout operating like a link on a web page: In a mouse click, ancillary information appears without the sense that it is subordinate because it appears at the end of a document in smaller letters. Strategically, providing details about Carson's life and those she loved will allow me to maintain a focus on her work. Marie Rodell was Carson's literary agent and one of the great relationships of her life. The child of Russian immigrants and five years Carson's junior, Rodell was "a world-wise, well traveled, sophisticated New Yorker fluent in four languages" and able to move "comfortably in many of New York's most elite literary and publishing circles" (Lear, WFN 152). When they met in 1948, they'd each "gotten to where they were...by hard work, grit, and determination as well as by talent" (Lear, WFN 154). Rodell graduated from Vassar College in 1932 and she worked for a time as an assistant editor at the William Morrow and Company (Lear, WFN 152). She was a writer herself, publishing

mysteries, short stories, and even a textbook before postwar layoffs "drove her out on her own as a literary agent" (Lear, WFN 153). According to Lear, Rodell was "temperamentally suited to the intellectual and social skills required of an author's representative," and her "literary taste as well as her grammar was impeccable; so were her ethics as a literary agent," and most of her clients became her friends (Lear, WFN 153). Care giving responsibilities, health-related issues, and other relationships may have caused temporary distance between them but they became close again after Maria Carson's death (Lear, WFN 350). Although Carson's literary success changed their friendship (Lear, WFN 241), Rodell's "patience, forbearance, and integrity won Carson's loyalty and affection" (Lear, WFN 155) and they remained an effective team throughout. Returning to the list at hand and according to Hynes, Free, a journalist and author "was responsible for getting the Department of Interior to name their new Maine coast wildlife reserve the Rachel Carson National Wildlife Refuge" (RSS 11). Bertell is described by Hynes as a scientific foresister of Carson's and "biostatistician who has done extensive research on the biological hazards of low-level radiation" (RSS 51). Hynes then relates Bertell's own list other women near and far who have picked up strands from Carson's research in Silent Spring, including Dr. Helen Caldicott, Petra Kelly, Solange Fernax, and Marie Theres Danielsson (RSS 51).

4 According to Gartner, "Common to both [Whitman and Longfellow] is a belief that pattern and order govern the universe, although [humans] are not wise enough to understand them fully" (63). And like Pope, "Carson condemns man's depredations, believing them not natural, like those of animals, but willful and controllable" (Gartner 65). For Shirk, the metaphorical language Carson invokes in Silent Spring echoes philosophical queries of "whether or not language can ever accurately reflect reality" (91).

5 Theo Colborn produced or evaluated the science in Our Stolen Future, but Diane Dumanoski and John Peterson Myers contributed to the writing and are listed as co-authors. I confess that for the sake of clarity, I will recognize primarily Colborn in discussions of their collective work.

6 With the notable exception of Hynes' The Recurring Silent Spring, Carson's name is often invoked to situate studies without necessarily engaging either her science or her writing. For example, John C. Barker and Robert J. Goldstein introduce their study "The DDT Paradigm and Electromagentic Fields: Policy and Scientific Uncertainty" stating that "DDT was a potent threat to human health and the environment. Nevertheless, it was in use in this country 20 years before Rachel Carson wrote Silent Spring, and for 10 years after that" (Barker and Goldstein 285). Even though Barker and Goldstein claim that Silent Spring "and its author are now widely lauded" (285), this statement must be balanced by R.M. Perrin's observation that "it is not easy to find members of the public who have actually read [Silent Spring], although most biologists are at least aware of it and the issues it raises" (95). Other writers in the sciences evoke Silent Spring as a metaphor, as in the title of Jeremy J.D. Greenwood's essay on the relationship between agricultural practices and the decline of farmland birds in Western Europe, "A Second Silent Spring?" As evidenced in studies like those listed above, Silent Spring has become an acknowledged, although largely unexamined, milestone in the scientific community. In a text designed to incorporate alternative perspectives into introductory biology curriculum in order to teach students about "doing biology," authors Joel Hagen, Douglas Allchin, and Fred Singer acknowledge that Carson was a meticulous researcher, but question whether or not it was appropriate for her to couple frequent and "often romanticized illustrations" with the scientific information presented in Silent Spring (190).

7 Under the Sea-Wind was originally published in November 1941. Carson's hopes for a popular reception were dashed when a month later, the Japanese attacked Pearl Harbor. Barely 2000 copies were sold (Lear, WFN 105).

8 According to Gartner, "Carson required discipline and sacrificed from herself, but unlike many artists who expect others to sacrifice their lives to them, Carson expressed warm appreciation for whatever help people might volunteer" (123).

9 See Marianne Hester's article, "The Witch-craze in Sixteenth- and Seventeenth-Century England as Social Control of Women" in the anthology, Femicide: the Politics of Woman Killing (New York: Twayne, 1992) for an interesting analysis of witch burning as a means of controlling independent women.

10 Theo Colborn, like Sandra Steingraber, is a scientist and has been compared favorably to Carson. In fact many see in Colborn and Steingraber a continuation of the work begun by Carson in Silent Spring. Prior to the publication of Our Stolen Future, Colborn, working with Dianne Dumanoski and John Peterson Myers prepared for the potentially vitriolic response from the industries that castigated Carson, however, they note that following some prepublication ad hominem attacks and complaints of unfounded alarmism by conservative commentators, the chemical industry itself was remarkably low-key and cautions in its public response; that in "marked contrast to its concerted campaign thirty-four years ago to discredit Rachel Carson and her message" (Colborn et al xvii).

11 Skinker was one of the great relationships in Carson's life and merits an introduction. Sadly, many of the details of her life have been lost. What is known is that she was born tenth of eleven children in

Denver, Colorado and grew up in a suburb of St. Louis (Lear, WFN 35). Her father was a successful farmer, but her mother died young (did I mention she birthed eleven children?) and Skinker and her younger brother were raised by an older sister (Lear, WFN 36). She earned a bachelor's degree in science from New York's Columbia Teacher's College and a master's degree in zoology at Columbia University in 1923, before accepting an appointment at Pennsylvania College for Women (Lear, WFN 36). Additional details suggest Skinker followed a path parallel to that of many women in science during the early twentieth century and her travails were not lost on her protégéé. While I will return to these trends in chapter five, for now I will note that more than once, Skinker's experience informed the decisions Carson made (Lear, WFN 63) and that as "single women in science, their choices were made for many of the same reasons" (Lear, WFN 57). According to Lear, "Skinker's career reflected the increasingly limited possibilities for women in the 1920s and 1930s" and despite the respect she'd earned among her colleagues in the sciences or the way she inspired her students as a teacher, she "was unable to support herself in full-time research or to advance academically because of a combination of impediments" (WFN 57), impediments that would eventually wear her down until she couldn't go on. While Skinker eventually completed her doctoral work in zoology from George Washington University, her success was hard-won and not at all guaranteed since she faced many of the same obstacles that prohibited Carson from finishing hers—lack of support, financial pressure, and ill health. Without the benefit of academic affiliation and with no hope of private sector employment, Skinker joined government service in 1936 as "the junior member of an unusual group composed largely of female parasitologists, none of whom was married and all of whom were extraordinarily fine scientists" under the dynamic leadership of Eloise B. Cram (Lear, WFN 96). Her good fortune gave way to wider trends when Cram was replaced by Emmett Price, "a southerner of many prejudices" who was "deeply intolerant of female scientists" and opposed to the policy that allowed women to be hired as scientists in the government (Lear, WFN 97). Skinker suffered Price's abuse for eighteen months before her health broke down (WFN 97).

12 I'll introduce two such early women of science and return to them intermittently throughout and to women scientists more generally in chapter five, "Science, Sisters, and the Sea: Rachel Carson and her Refusal to be Silent on Matters of Science in the Sea Books." My choice for Anna Botsford Comstock and Ellen Swallow (Richards) is not arbitrary, but because these are two frequently invoked in discussions of Carson. Comstock (who will also make an appearance in my chapter two, "Mother, Sea, and Material Immortality") influenced the shape and direction of Carson's evolution as naturalist most directly because of her best known and most enduring work, The Handbook of Nature Study. First published in 1911, the comprehensive and cross-disciplinary text saw twenty-four editions (the last in 1939), was translated into eight languages, and "is still in frequent use today" (Kass-Simon 256). Born in 1864 to progressive parents in rural Cattaraugus County, New York, Comstock was religious, but a freethinker and educated in a number of excellent schools (Bonta 154). She met husband entomologist John Henry Comstock while attending Cornell University as a languages and literature major (Bonta 155). During a break in her studies, they became engaged and Comstock learned to share an interest in her husband's work and his students. As his assistant, she helped "him with his clerical work and various diagrams for his lectures" and in 1885, returned to finish a Bachelor of Science degree in natural history (Kass-Simon 256). She was an accomplished natural history artist, producing detailed illustrations of insects (to scale) in pen and ink (Bonta 157) and finely crafted wood engravings for her husband's textbook, An Introduction to Entomology (Bonta 158-9). Comstock was the first of four women to be initiated into the national Scientific Honor Society in 1888 (Kass-Simon 256) and "the third woman to be elected into the American Society of Wood Engravers" (Bonta 159). During the mid 1890's, Comstock was swept up into the emergent Nature Study Movement and began an association with Liberty Hyde Bailey, the head of Cornell's Horticulture Division and inspired leader of the movement (Bonta 160). Bailey would later remember Comstock as a woman of "high achievement, noble service, unselfish co-operation, constructive counsel, inspired teaching, loving kindness and unforgettable companionship" (Bonta 166). She was the first woman to achieve the rank of Assistant Professor at Cornell University in 1899, although she was downgraded to Lecturer the following year. That rank would be restored in 1913 (Kass-Simon 256). In 1919, at the age of sixty-five, Comstock was promoted to full professor, but she had long since earned recognition from the informal title of "Dean of American Nature Study" (Bonta 164-5). Some histories of ecology "in the North credit the German Ernst Haeckel with naming the subject in 1873 [. . .] while the contribution of his contemporary, the American ecologist and educationalist Ellen Swallow, is largely ignored, although she equally could be claimed to have founded the science of ecology" (Mellors 14). Swallow attended Vasser and was mentored by astronomer Maria Mitchell (Rossiter 12). She was "multidisciplinary: a water chemist, industrial chemist, metallurgist, mineralogist, engineer, and expert on food and nutrition" (Mellors 14) although according to Hynes, her "entire adult life was a series of crusades to prevail against the obstacles put in her way by the Massachusetts Institute of Technology, first to matriculate in the

chemistry department, then to be admitted to the Ph.D. program, and finally to be given a tenured faculty position. The Ph.D. and tenured position were never granted her, although MIT recognized and used her brilliance by retaining her as an instructor for 25 years" (Hynes: RSS 5). In 1879, a year after MIT began to admit women, she was "appointed an instructor in sanitation chemistry, a position she held until her death in 1911" (Rossiter 68). In a speech given to the Association of Collegiate Alumnae, Swallow "stressed how challenging efficient housework could be and how much it could be improved by the application of scientific principles" and suggested such domestic science "would not only help college women lead more efficient home lives, but would also bring them into touch with pressing local social problems" (Rossiter 68-9). [Swallow's] most notable work—the founding of the interdisciplinary science of ecology—was delegitimated and rejected by the scientific aristocracy of MIT, as unpedigreed, insufficiently specialized, and too much a field of women. In the latter part of her life she took the same science to the audience more receptive to her—women in the home—calling it domestic science or home economics... The woman who started the first laboratory for women at MIT finished her life professionalizing housekeeping, cooking, and child care. (Hynes, RSS 5-6)

13 Buker makes this charge in Talking Feminist Politics: Conversations on Law, Science, and the Postmodern. Though harsh, Hillary Rose makes a similar, though more contextualized observation when she notes that "Second wave feminism began relatively slowly to analyze and contest science, to see the connections between 'it' (whatever it was) and those issues the movement defined as its own. There were good reasons why the movement was slow; its central preoccupation was with women's shared experience, to reclaim what had been denied or trivialized out of existence and return it to social and political existence" (Rose 58). In addition, Rose claims that the feminist scholarship that has been produced "has rendered visible the exclusion of women from science; it has rescued from the oblivion of male history many of the women who have entered science; it has fostered the coming together of feminist scientists to rebut the claims of biological determinism; and it has recognized the theory and practice of the domination of nature as the specific feature of masculinist bourgeois science" (Rose 72). Even so, in addition to Buker and Rose, there are many excellent scholars making contributions in this area including Evelyn Fox Keller, Londa Schiebinger, Sandra Harding, and Donna Haraway.

14 In fact, it was a situation Carson addressed openly on more that one occasion. For example, shortly after the publication of The Sea Around Us, Carson spoke publicly "about the culture of science in America and attacked the prevailing notion of science and literature as separate and exclusive methods of investigating the world and discovering truth" (Lear, WFN 218).

15 First, I borrowed the phrase "stirringly romantic" from Hynes' review of Always, Rachel: The Letters of Rachel Carson and Dorothy Freeman, 1952-1964. In her review, Hynes writes that "[t]hese two women, Rachel Carson and Dorothy Freeman, expressed their love within the constraints of their lives and times—through stirringly romantic letters, visits, telephone calls and the almost telepathic communication intimates often share" (Hynes, "Together Forever" 16). Second, revealing the controversy regarding their relationship, Freeman is variously described as "a near neighbor of [Carson's] in Maine"(Leopold 120), "a close friend" (Gartner 119), and a romantic partner (Lear, Book Review 84). In reality, she was all of these, although the social and political import of each is quite different. According to Hynes, "one senses that in a different time, they would have loved more thoroughly and explicitly. This was a love affair through letters, but still a love affair" (Hynes, "Together Forever" 16). I will return to Freeman and her relationship with Carson in chapter three, "Parting Fronds and Probing Fingers: Rachel Carson Takes her Love to the Sea."

16 Please refer to chapter three, "Parting Fronds and Probing Fingers: Rachel Carson Takes her Love to the Sea," for more complete discussion of Witness for Nature in regard to Lear's resistance to portray Carson as lesbian.

17 In my mind, feminisms must remain vital to evolve and resist ideological entrenchment. Buker insists, "...feminist discourses continue to revise theories and generate new understandings, new words, new images, and new metaphors. In this sense, feminism offers a new paradigm and alters other paradigms. Sometimes the paradigm shifts offer methods of inquiry, revised vocabularies, new canons, fresh conceptions of the self, and renewed concerns for political deliberation" (Buker 3). I will return to these issues in chapter four, "Living on the Edge: Locating the Other in Rachel Carson's Three Studies of Shores and Seas."

18 According to Susan Lanser, "Both narrative structures and women's writing are determined not by essential properties or isolated aesthetic imperatives but by complex and changing conventions that are themselves produced in and by the relations of power that implicate writer, reader, and text" and where "constituents of power must include, at the very least, race, gender, class, nationality, education, sexuality, and marital statues, interacting with and within a given social formation" (Fictions of Authority 5-6).

19 I am purposefully foregrounding works produced by women and particularly those women who identify themselves as belonging to more than one subject position. This is an artificial constraint on my part,

one cultivated from my experience as a graduate student. First, it was a strategy developed in response to painful feelings of isolation within the academy. Gradually, giving priority to the margins became critically and politically empowering, shaping my research methodology and building bridges to others like me. These are issues I will return to again in chapters four, "Living on the Edge: Locating the Other in Rachel Carson's Three Studies of Shores and Seas." For now I will simply acknowledge that there are indeed many categories of oppression, some more clearly defined than others. For example, regionalist writers, perhaps particularly Southern writers, have published series related to a community and reflecting communal life/values. William Faulkner may seem and unlikely candidate, yet reflections of race, gender, and class oppressions merge and intermingle with additional strata of ageism and ableism (among others) in his Yoknapatawpha County, Mississippi, so that his critique of society is remedied only by the overwhelming attachment of each story to story, novel to novel. Writers and critics that come from a broad spectrum of perspectives will be consistently centered throughout this project, even when that means the omission of more obvious and mainstream examples.

20 In direct contradiction to Raglon's statement, Carson openly acknowledges in The Sea Around Us that "[t]he ocean is the earth's greatest storehouse of minerals" (185). Raglon's observation reveals a perspective limited by her privileging of Silent Spring and is typical of the way that critical work on Silent Spring narrows and even ignores issues that resonate through Carson's entire body of work, simply because they are less apparent in Silent Spring.

21 In fact, Carson is the only woman to earn a place of distinction among Gilbert White and John James Audubon, Henry David Thoreau and Charles Darwin, John Muir and Henri Fabre, Ernest Thompson Seton and Donald Culross Peattie (Bonta 265).

22 Scholars agree (across the board) that like most writers, Carson required solitude and quiet to write, and like most women writers, she rarely had that "room of her own." Still, Carson's process did not require complete isolation. Indeed, she relied on those closest to her to contribute meaningfully to the production of each piece of writing. Carson's mother Maria was a constant partner in the production of her writing throughout her life. Other important collaborators included Marie Rodell, Dorothy Freeman, Ada Gowan, and Lois Crisler. The degree of collaboration in Carson's work and the extent to which she was the authorized voice of a discrete community has yet to be examined.

23 Lear's Witness for Nature is the most comprehensive biography of Carson and provides an exhaustive report of Carson's complicated family life, her responsibilities as breadwinner and caregiver, as well as her own history of relentless and nearly debilitating illnesses.

24 According to Gartner, Carson "clearly expected reader participation to last beyond the reading of [Silent Spring]" (58), and Hynes claims that Silent Spring "was activist, not just expository" because it was written to reform, not just to have a forum" (RSS 4).

25 *The New Yorker* published nine condensed chapters in three long profiles of The Sea Around Us in June 1951 (Lear, WFN 198). The Sea Around Us was published in July 1951. (Lear, WFN 202)

26 By this time in her career, Carson had developed an extensive array of colleagues and research associates, with whom she communicated regularly. In addition, Carson tried to remain connected to a growing assortment of fans. Louise Halle, a fellow author recalled after having tea with Carson and her mother at their home in Silver Springs, Maryland that she was "paying a common penalty of fame, for she had become a public institution without having the facilities of an institution. She was daily overwhelmed by mail from her readers, mail that such a conscientious person would feel obligated to answer in detail. But she did not have the research assistants and the secretaries that, as a national institution, she needed. I doubt, moreover, that she would have enjoyed running herself as one runs a business. She could not have got away from being a simple human being; she could not have made herself behave like an institution" (Brooks 98).

27 Because of the intricate passageways of loggerhead sponges, "the shelter and available food they offer, have attracted many small creatures to live within the [it]. Some come and go; others never leave the sponge once they have taken up residence within it" (TETS 217). While this seems like a rather specialized arrangement, Carson includes several other examples such as Convoluta, which will be detailed further in chapters two and three.

28 Many of Carson's colleagues, biographers, and scholars have commented on her high standards, perfectionist tendencies, and strong work ethic. Gartner claims "the attribute that most clearly marks her work is consistency" (110) although such work is more time consuming and exhausting to produce. Despite Carson's already high intensity life, negotiating and missing deadlines added ongoing and increasing pressure to an exacting writing process.

29 For example, Gartner claims that "The Edge of the Sea is more limited than Carson's two previous sea books" (83). With "long sketches of competent but undistinguished writing" and an overall effect that is didactic (Gartner 81), she finds "the level of artistry is less consistent in The Edge of the Sea" (Gartner 78) than in the former two books. Gartner concludes: "Carson was working at a lower level in The Edge of the Sea, a book written during the first hectic stages of her unexpected fame. But Carson's lower

level is still writing of a higher quality than most guidebooks to the shore or nature books about the sea" (85).

[30] Firstly, this is not to say that the sea books were wholly without controversy after publication. Frequently, at the same time they were praised for literary merit, the clarity and command of science caused speculation about the gender and appearance of the author. According to Lear, "...glowing assessments were exceptions to the book's initial reception among scientists and science writers, who praised it but without enthusiasm. Some reviewers, most of whom were male science writers, were hesitant to give Carson or her book the critical accolades that such a display of learning and eloquence deserved. Their reviews of The Sea Around Us were prejudiced by qualities they held against the author: Carson's status as a scientist, the audience she addressed, and her gender" (WFN 206). Secondly, the image of Carson as a spinster is one that many contemporary readers find troubling for more or less obvious reasons; nonetheless, it is an image that remains fully loaded with social and cultural significance, and will be unpacked more carefully in the chapters ahead. The image of the spinster (as it is currently understood in our culture) seems calculated and cruel given Carson's failing health and aging body. For now I would like to mention that the ways in which Carson's body has been represented and described in public records (such as reviewers that remarked on her appearance as well as the biographers that have noted Carson's own studied, self-conscious construction of a feminine affect), are deeply troubling and I will deal with at least some of these images in chapter three. This is an area that I would like to investigate more fully—but not in this project.

CHAPTER II.

MOTHER, SEA, AND MATERIAL IMMORTALITY

Rachel Carson left an extensive public record of service as an advocate for the environment and a government scientist who researched and wrote popular books about the sea. Because she accomplished so much in her careers, some have imagined that her private life was one unfettered by the burdens of domestic obligation, but that is not the case at all.[1] She had a full, complex, and consuming personal life, beginning with her roles as daughter, sister, aunt, and caregiver and leading to her shouldering the responsibly for the welfare and financial support of a large, extended household. Following the death of her father, Carson inherited the burden of financial support for her mother and a divorced sister with two young daughters as well as the intermittent support of an adult brother. That was 1935. She was 27. Within two years, Carson's sister Marian died and her daughters became full-time members of Carson's brood. Later, the household would expand even more to include a grandnephew whom Carson would adopt following the death of her niece, his mother. Caring for others was a primary occupation in her personal life, and it affected her writing as well. According to Carol Gartner, Carson's sea books

> were written under particularly difficult conditions, the first two while working full-time in a demanding editorial position, and the last under the combined pressures of passed deadlines, personal crises, and the burgeoning need for more and more information. (124)

Despite the fact that she was "the breadwinner, emotional axis and solid center of an extended family" (Hynes, "Together Forever" 15), none of what Carson was able to achieve in her life would have been possible without the dynamic and productive partnership she shared with her mother, Maria Frazier McLean Carson.

Under the nearly unrelenting strain of financial insecurity, with family hardship due to illness and ill fortune, and within an increasingly restrictive post-World War II social climate, mother and daughter remained committed to each other and worked efficiently as a team throughout. According to H. Patricia Hynes in Recurring Silent Spring,

> [t]hey enjoyed a lifelong bond constructed of the mutual love of ideas, Maria's constant support of Rachel's work, their shared raising of Carson's nieces and then grand-nephew, and last, a mutual commitment to the purpose of Silent Spring. (10)

Mother and daughter lived together for nearly 50 years, from Rachel's birth to Maria's death (Hynes, RSS 55), and the longest they were separated was a nine month period in 1929 while Rachel prepared for graduate school in Maryland and was unable to afford visits home to Pennsylvania (Lear, WFN 67). Maria "fostered her daughter's love for books, cultivated her sense of artistry and love of music, and encouraged her ambition to write" (Gartner 6). Maria and Rachel shared an amazingly cooperative, creative, and fruitful partnership and reflections of those experiences and values appear throughout Carson's writing.

In this chapter, I begin to establish a context for Carson's life and examine the integral role of care giving and interdependence with particular attention to her relationship with her mother. The roots of her most radical challenges to dominant ideologies and institutions came from the promotion of affirming values she practiced in her personal life, not in response to her participation in public discourse. Yet it is predominantly her public life that has been recalled and reissued by biographers and scholars. Therefore, while I must rely heavily on biographical information accumulated by others to contribute to the context I will present, I do not always rely on their assessment of those details.[2] Central to my concern in the pages ahead are Carson's

concept of material immortality and her attention to matters of sex and gender. First, I will explore the cycles that constitute her concept of material immortality closely, and suggest that the underlying theoretical framework is inherently matrilineal. Then, I will demonstrate the ways in which Carson's descriptions of the natural world undermine sex, gender, and heterosexuality as primary, reliable, or even stable categories, and how she promotes a universal ethic of caring without essentializing experiences generally held to be exclusively women's. In so doing, I will advance an argument that Carson, though a participating member of patriarchal society and a practitioner of science, actively promoted a viable alternative to more prevalent descriptions of the natural world politically charged with dominant ideologies of oppression.

Surpassing even her life-long love of the sea, Carson's first, most consequential and enduring bond was the one she shared with her mother. Maria Carson was the product of nineteenth century middle-class sensibilities and beneficiary of the work of first wave feminists. While few details remain to chronicle the life of Maria's mother, Rachel Frazier Andrews McLean, recent Carson biographer and environmental historian Linda Lear finds she was both opinionated and independent; following the death of her Presbyterian pastor husband, Carson's grandmother raised her daughters to be the same (WFN 10). Maria honored her mother by naming her youngest daughter after her, suggesting that mother-daughter attachments were significant in their family (Gartner 5). Both Maria and her sister "displayed intellectual curiosity and promise in their studies" (Lear, WFN 10), although Maria was the more studious of the two. She graduated from the Washington Female Seminary in 1887, a talented musician with special honors in Latin (Hynes, RSS 56). After graduation, Maria taught school, gave private piano lessons, and was an enthusiastic member of the Washington Quintette before getting married (Lear, WFN 11).[3]

Carson's parents met during a choral social in the winter of 1893 and although Maria had been "well prepared for civic responsibility and Christian motherhood" (Lear WFN 9, 10), even-tempered and affable Robert Warden Carson was not as prepared to meet his share of familial responsibilities. According to Lear, when Maria married him, "she exchanged narrower social and economic circumstances for the opportunity of marriage and family" (WFN 13), and during their marriage, Robert demonstrated a consistent inability to provide financial stability for the family. Although Rachel was the only Carson child to continue her education past the tenth grade, her pursuit added strain to the family's already precarious economic status.[4] To make ends meet during that time, Robert took loans and parceled off his land, while Maria sold apples, chickens, and the family china in addition to increasing her roster of piano students (Lear, WFN 25). By all accounts, Robert Carson was not "a significant influence on his daughter's development or outlook" (Lear, "Rachel Carson's SS" 43n1), although he didn't stand in her way, either.[5]

Maria's influence on Rachel on the other hand, is beyond dispute. She was a religious person who would be remembered for singing hymns as she went about housework and domestic chores late in her life (Lear, WFN 541n19). She was also a devoted follower of the nature study movement, which was rooted in both theology and natural history. Nature-study advocates like Anna Botsford Comstock and Liberty Hyde Bailey wanted to put children in sympathy with nature in order to teach them civic and moral responsibility (Lear, WFN 14). Maria was particularly fond of Comstock's The Handbook of Nature Study and she was not alone. First released in 1911, Comstock's 938-page text became the all-time best-seller among books published by Cornell University (Bonta 154). The handbook was "crammed with information on every subject from weather to birds and from rocks and minerals to reptiles" with poetry interspersed

throughout, "giving the book beauty as well as factual information" (Bonta 164). Maria responded to this melange with zeal, and

> [f]rom the time Rachel was one year old, she and her mother spent increasing amounts of time outdoors, walking the woods and orchards, exploring the springs, and naming flowers, birds, and insects. (Lear, WFN 16)

The handbook contained "232 meticulously planned lessons to follow, complete with suggested field trips, experiments, and questions to ask students" as well as a large section devoted to pedagogy and a bibliography (Bonta 164). With the orchards, woodlands, and secluded fields that surrounded their remote Homestead as a classroom, Maria worked through Comstock's handbook with all of her children.[6]

During her years of public school, Carson was frequently absent and tutored by her mother.[7] It was during these early halcyon days that Carson developed the environmental consciousness and sense of responsibility that friends and colleagues would later describe as uniquely her own. For example,

> [w]hen they returned from their woodland adventures with treasures to show her, Maria instructed the children to return them to where they had been found. 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, WFN 15)

Decades later, illustrators and friends Bob Hines and Shirley Briggs would be among those to recall with tender amusement how Carson insisted that flora and fauna gathered during their research must be returned whenever possible. According to Gartner, Carson's friends told many "dramatic stories about how she always returned specimens to the places in the ocean where she had found them, often waiting for the proper moment in the tide, and picking her way late at night down to the shore" (7).

Once she'd secured her dream of a summer cottage in Maine, Carson built a steep stairway to descend over the rocks to the water's edge so that she could more easily carry subjects to her laboratory, then back to their homes on the shore (Lear, WFN 244). This ethic of caring with its implicit component of action was instilled in Carson by her mother, sustained by their abiding partnership, and ultimately channeled through the sea books.

Carson proclaimed the love she felt for her mother through articulating and sharing her love of the sea in Under the Sea-Wind, The Sea Around Us, and The Edge of the Sea. Maria was a constant companion on Carson's research excursions and contributed invaluable assistance and support for Carson's writing process. Under the Sea-Wind was dedicated to her mother and, according to Lear, once Rachel completed her final revisions, Maria "flawlessly typed the finished manuscript, and together they drove to the imposing U.S. Post Office in the District of Columbia on New Year's Eve to send it off" (WFN 102). When Carson received her copies of the newly published books, she gave the first one Maria, who wept with joy when she saw the simple dedication, "To my mother" (Lear, WFN 103). Carson's tribute to her mother did not end with Under the Sea-Wind. The section "Mother Sea" opens and consumes most of The Sea Around Us before turning into "The Restless Sea" and finally giving way to the smallest section on "Man and the Sea About Him." In her essay, "Rachel Carson and Her Legacy," Rebecca Raglon claims that Carson reworks the well-known metaphor "mother earth" in The Sea Around Us, by transforming it into the more appropriate "mother sea" all the while utilizing a "deliberately biblical" tone (Raglon 202). For me, the result remains maternal and lacks the paternalism inherent in prescriptive scriptures.[8] For example, in tracing the history of the sea, Carson acknowledges that there is much we don't know because, "[b]eginnings are apt to be shadowy, and so it is with the beginnings of that great mother of life, the sea" (TSAU 3). For Carson, the mysteries, riddles, and complexities of life are

balanced by simple truths like all living things are related because we are all children of the sea, and the work of mothers is centrally important to surviving and even thriving in the world.[9]

Carson readily admits the unknown and is undaunted by details that may be in fact unknowable. Such ambiguity is in opposition to Western patriarchal ideologies of science that postulate a perspective that is paternal but objective, and knowledge that is incomplete but omnipotent. Carson unseats patriarchal ideology further by locating the ancestry of all living things not in memory or the potential of the mind, but in our bodies. For example, when the first creatures ventured onto the shore to take up life on land, they "carried with them a part of the sea in their bodies, a heritage which they passed on to their children and which even today links each land animal with its origin in the ancient sea" (TSAU 13). Evidence of shared oceanic ancestry resides within the bodies of all living beings, although some have made the evolutionary move to land, while others have remained in the sea. Some have even moved from sea to land and then back to sea. For lime-bearing algae, the evolutionary clock has stopped and through "all the intervening eons of time, while group after group of living things [have] risen up and died away," they continue to live in the sea, "forming their small protective shields of lime [. . .] unchanged in shape and form from those of their earliest ancestors" (UTSW 264-65). For humans and other vertebrates,

> our lime-hardened skeletons are a heritage from the calcium-rich ocean of Cambrian time. Even the protoplasm that streams within each cell of our bodies has the chemical structure impressed upon all living matter when the first simple creatures were brought forth in the ancient sea. (TSAU 13-4)

Thus, Carson shows that shared body chemistry reveals a shared heritage, despite the infinite range of differences and destinies that have resulted from our common

beginnings. Introducing humans to their cousins of algae is typical of the way Carson gently presses against the limits of readers' expectations thus helping them increase their range of perception and garner a greater tolerance for difference. In addition, by utilizing references to family that are both appropriate and accurate, she provides the emotional comfort of connection and continuity to ease the transition. As I will show shortly, Carson uses similarly subtle and persuasive strategies to critique categories of sex and gender.

Reinforcing family ties and the other ties that bind must have come easily for Carson, who cared deeply for others and was cared for as well. Maria and Rachel were domestic partners, sharing and sometimes temporarily alleviating one another's burdens.[10] In the summer of 1951, even as Carson enjoyed rare solitude conducting research at distinguished Woods Hole Oceanographic Laboratory in Massachusetts, Lear notes that

> Maria Carson was indispensable to her daughter both emotionally and practically. She was secretary, office manager, and the filter through which most requests had to go. In between she sent Rachel clothes and other things she needed, did her laundry for her, and kept her updated on family matters. (Lear, WFN 209)

A year later, Maria joined her daughter when she returned to Massachusetts for research at the Marine Biological Laboratory. Then, she "kept house while Rachel worked at the MBL library during the day and returned to her laboratory at night" (Lear, WFN 233). Maria Carson's domestic labor created invaluable pockets of time for Carson to work alone, but her contribution to her daughter's process did not end there. She stimulated Rachel's imagination with intellectual and moral sustenance, shaped her talent with unconditional practical and emotional support, and assisted her writing process directly, drafting and workshopping each piece Carson wrote.

Maria began to encourage her daughter's writing when she first put pen to paper, and started her "out on a path that would lead to Rachel's successes, [by] encouraging her to submit stories to the popular *St. Nicholas Magazine*" (Wilson 45), a magazine for children she'd loved and had received even prior to Rachel's birth (Lear, WFN 18). Founded in 1873, *St. Nicholas* has been regarded as "the best magazine ever published for children" and must have particularly appealed to Maria because "no other juvenile magazine of this period adopted the values of the nature-study movement more completely" (Lear, WFN 18). In 1918 and just shy of her eleventh birthday, Carson began her career as a writer when her story was chosen for publication in *St. Nicholas Magazine* (Lear, WFN 7) and "awarded a silver badge for excellence in prose" (Lear, WFN 19). Years later, when she "recalled that childhood time... she always linked [that] first *St. Nicholas* story with her love of nature and her mother's influence" (Lear, WFN 7). In addition, Lear notes that "Rachel's literary success also had an impact on her mother" (Lear, WFN 19), and Maria soon began planning for her talented daughter to attend an appropriate college.

Together, Carson and her mother decided that she would pursue writing as a profession by majoring in English at Pennsylvania College for Women; when Carson fell in love with science and decided to change her major, she knew that she would risk her mother's dreams in order to follow a much less certain career path (Lear, WFN 43).[11] Carson's choice for science was one of the few times in her life that she would choose her desires over her responsibilities to others, and a rare example of her deviating from a plan she and her mother had determined together. Even so, Maria trusted her daughter, accepted the decision, and adapted quickly to excursions outdoors that increased in frequency and rigor, but in every other way were just like the ones they'd always enjoyed together.

Years later as Carson systematically explored beaches and tide pools, she'd break periodically to take movable beings to her mother to inspect while Maria "waited on the shore, enjoying the ocean view and watching lobstermen" (Lear, WFN 136). At other times, Maria "would go down at low tide to feed the gulls while Rachel clamored over the rocks looking for creatures hidden in and under the seaweed" (Lear, WFN 244-5). When it was not possible for Maria to accompany Rachel, the two kept in close contact, exchanging endless chains of letters and telephone calls. Upon returning from one particularly memorable research venture, Carson "stayed up most of the night sharing her voyage with her mother" (Lear, WFN 172). While biographers have recognized the significant bond between mother and daughter, there has been little or no acknowledgement of the extent to which Maria impacted, influenced and contributed to Carson's work.

Maria assisted her daughter in every way she could, and that sometimes included working collaboratively with her. Because Carson "was a slow, painstaking writer, preferring to revise paragraph by paragraph, sometimes even sentence by sentence" before going on to the next one, completing each piece was an excruciating and exhaustive production (Lear, WFN 100). As in most other areas of their lives, mother and daughter developed working arrangements that were cooperative and comfortable. When Rachel was an undergraduate student at Pennsylvania College for Women in the mid-1920s, Maria visited her on the weekends her daughter didn't come home. On campus, mother and daughter would read together in the library and sometimes Maria typed Rachel's papers (Lear, WFN 30). When she was working on Under the Sea-Wind in the late 1930s, Carson wanted to create an engaging atmosphere with alliteration and rhythm and would read passages aloud to herself before asking her mother to read them to her (Lear, WFN 100). While Carson was at the Bureau of Fisheries during the day, Maria typed the changes she'd made the night

before, so it would be on her daughter's desk when she returned home from work. According to Lear,

> [i]t was a pattern mother and daughter held to with every piece she wrote. Each draft was read aloud, over and over, until Rachel was satisfied with the way it sounded as well as the way it read to the eye. (WFN 100)

While working on The Sea Around Us during the late 1940s and into the 1950s, Carson was similarly "conscious of sound, alliteration, and rhythm in her writing" and reworked entire sections "over and over until she was satisfied with the cadences, the sonority as well as the clarity of each sentence" using the same work-shopping strategy with her mother (Lear, WFN 219). In later life, Carson would recall "her mother's role as sympathetic critic and how she had read her books out loud to her" (Lear, WFN 460). Much of what Carson accomplished resulted from mother and daughter sharing purpose and commitment and working productively, efficiently, and collaboratively together.

A high value on mother-daughter relationships is reflected as matrilinearity in some of the most important concepts communicated in Carson's writing. Even in the earliest examples of her work, such literary themes are evident, including "the ecological relationships of ocean life that have endured for eons of time and the material immortality that involves even the smallest organism" (Lear, WFN 86).[12] In Under the Sea-Wind, Carson claims that "in the sea, nothing is lost. One dies, another lives, as the precious elements of life are passed on and on in endless chains" (105). For Lear, the very word "sea-wind" underscores Carson's "ecological vision of the unity of nature" since it is the sea-wind that "binds equally within its breath the lives lived in air and those in the sea" (WFN 103). There is continuity, not separation, between land and sea in the incessant exchange of materials between them. Individual lives end, but bodies continue—if only in their constituent bits. There are no exceptions to this process. Many critics have noticed that Carson's "concepts of the ecological relationships among all

living things and their environments, and the continuous recirculation of resources, dominate [her earliest writing] as they do in her later work" (Gartner 12) and that at "the core of Carson's writing are the themes of interconnectedness and material immorality" (McCay ix). In spite of these acknowledgements of the importance of the constant collection and reapportioning of resources in Carson's writing, they have not been sufficiently examined, given the degree of her preoccupation with describing such systems.

Examples of material immortality fortify the foundations of the sea books. In The Sea Around Us, Carson reports that "[n]othing is wasted in the sea; every particle of material is used over and over again, first by one creature, then by another" (30). In The Edge of the Sea, she identifies the "little seashore insect, Anurida maritima" as "one of the scavengers that play a part in the economy of the sea, keeping the organic materials in circulation" (113), and describes how mackerel eggs are "seized and eaten by [. . .] comb jellies, to be speedily converted into the watery tissue of their foe and in this reincarnation to roam the sea, preying on their own kind" in Under the Sea-Wind (118-19). The cycle of recirculation may take many forms. In the passage below, living creatures live on when their bodies turn to stone dwellings for others:

> The horny corals or gorgonians, known as sea fans and sea whips, all contain limestone spicules in the soft tissues. These, along with lime from starfish and sea urchins and sponges and an immense number of smaller creatures, will eventually, with the passage of time and through the chemistry of the sea, come to form part of the reef. (TETS 199)

Most frequently, material immortality takes the shape of elemental exchanges and chemical chains. While examples are replete throughout the sea books, a favorite of mine from Under the Sea-Wind suggests the incredible breadth of time and distance that can be involved in the revolution of such cycles:

> All of the living flesh of [ancient] sharks was returned to the sea millions of years [ago], to be used over and over again in the fashioning of other creatures, but here and there a tooth still lies in the red-clay ooze of the deep sea, coated with a deposit of iron from a distant sun. (262-63)

The emphasis on repetitious chains reinforces the sense that material immortality is achieved through endless cycles that might be vast, complicated, convoluted, and involve interruptions, periods of entropy, and incidents of circulation, but never completion. In The Edge of the Sea, Carson notes that the transport and wide dispersal of living organisms "are a continuing, universal process—an expression of the need of life to reach out and occupy all habitable parts of the earth," and that "the pattern is set by the shape of the continents and the flow of the currents; but it is never final, never complete" (27). For Carson, bodies continue forever in a kind of cosmic recycling system whereby death turns to life, the finite becomes infinite, the ephemeral is made immortal.

By locating physical bodies and elemental materials high in her cosmology, Carson privileges perspectives generally attributed to women and understood as subordinate to the relative perspectives of men. The connections between women and nature versus men and culture in Western traditions are covered in detail in my chapter four, "Living on the Edge: Locating the Other in Rachel Carson's Three Studies of Shores and Seas." Here, I will assert that many of the cycles Carson identifies as materially immortal can also be understood as matrilineal. There is an important, direct illustration of this in Under the Sea-Wind when Carson describes migratory journeys begun by one generation of mothers and completed by the next generation of daughters. Young eels "born of the darkness of the deep sea," where their parents went "to die and become sea again" (UTSW 256), complete their incredible intergenerational migration when the daughters return to the sweet water homes of their ancestral mothers. As

Carson explains, the last of the migrant eels were roe eels, "for only the females ascend far into the fresh-water streams, beyond all reminders of the sea" (UTSW 219). Though Carson is clear that she is referring to sexual distinction, gender implications are hard to avoid. Carson was not merely preoccupied with the identification of eternal cycles, but the active promotion of particular themes in those cycles. Locating immortality in the body and not in the spirit and invoking matrilinearity as an explicit example of material immortality demonstrate Carson's privileging of the perspective of women as mothers in Western culture and valuing mothers and daughters and their prominent role in perpetuating alternatives to patriarchal society.

In each of the sea books, there are examples of material immortality that pay tribute to mothers and mothering, exclusively and directly. As with Carson's promotion of matrilineal cycles, cycles exalting mothers are signaled first as cycles of the body. Instead of the immortality achieved through the constant recirculation of elemental resources, these patterns suggest continuity in all manner of bodily rhythms, repetitive movements, and instincts. Demonstrating the incredible array of intersecting cycles that comprise the natural world and adding another dimension to the reproductive migration of eels framed in the previous paragraph, Carson describes the ongoing exchange among ocean and land and eels, lying offshore in March seas. The eels are midway in their journey and both sexes school together outside of the bay. For Carson, it is but brief respite in a life otherwise filled with constant movement and change, reminiscent of the rhythms of larger bodies. She observes that as the eels lay in wait for the next turn,

> so the relation of the sea and coast and mountain ranges was that of a moment in geologic time. For once more the mountains would be worn away by the endless erosion of water and carried in silt to the sea, and once more all the coast would be water again, and the places of its cities and towns would belong to the sea. (UTSW 271-72)

Carson's field of vision takes in the bodily cycles of eels and equates them with the inevitable exchange between bodies of water and land. She reiterates her focus on the certain inevitability of cyclic movement with repetitive narrative strategies. Above, the phrase "once more" echoes like a chorus set to a rhythm of hypnotic s-sounds that, together, reinforce a sense of maternal comfort in the assurance of continuity.

Elsewhere, Carson notes that it is the living sponges, not the rock walls or salt water that provide that sense of timelessness evident in many tide pools. During the low tides of summer, she visits the same tide pools each day and finds sponges that "seem unchanged—the same in July, the same in August, the same in September. And they are the same this year as last, and presumably as they will be a hundred or a thousand summers hence" (TETS 123). Lear claims that ancient, endless, sometimes even violent cycles are comforting in their certain repetition and identifies Carson's long view and her promotion of an ongoing stream of time as persistent leitmotifs in her writing (WFN 205, 103). The stream of time is an appealing abstraction, but one that removes the corporeal elements and loses the implications grounded in gender that I find so prominent in the cycles that represent Carson's material immortality. According to Mary McCay, the "endless cycles described by Carson relate all creatures in the community of nature and connect them to its timeless patterns" (26). Carson believed nature and the cycles therein to be the great realities and insisted that natural history did not encourage an escape from reality or "the problems of twentieth-century life" (Lear, WFN 205). So, while Carson acknowledges that the lives of many creatures "are bound together by interlacing ties, in the relation of predator to prey, or in the relation of species that compete for space or food," she declares that overall, the sea "itself exercises a directing and regulating force" (TETS 109). This force is not particular, nor is it localized, but exacts a nurturing, almost parental presence nonetheless, typically experienced and

expressed through the body. For me, this is the source of the mothering streak in Carson's "sense of the eternal cycles of the sea" (McCay 32).

What I am referring to as a maternal streak in the sea books is a steady, consistent valuing of characteristics generally associated with mothers and mothering in Western culture. It may seem surprising, then, that in many of the examples I cite below and when I return to this issue with celerity, matters of sex and gender are significantly downplayed or completely excluded. In a passage I find incredibly moving, Carson communicates the life cycle of moon jellyfish, beginning with the flood tides of late fall that cast increasing numbers of beautiful white discs onto the rocks along the shore. She explains,

> Here their battered bodies became once more a part of the sea, but not until the larvae held within their arms had been liberated into the shallow waters. Thus the cycle came to the full, for even as the substance of the moon jellies was reclaimed for other uses by the sea, the young larvae were settling down for the winter on the stones and shells, so that in the spring a new swarm of tiny bells might rise and float away. (UTSW 158)

Material immortality reconciles the rift between destruction and creation. Despite the crushing and violent backdrop of the scene, Carson conveys continuity in bodies, the promise of fecundity, and the power of protective, maternal care. Moon jellies exhibit rhythmic and circuitous material immortality in their regenerative cycles. Other examples provide less direct manifestations of mothering activities and interaction, but are no less powerful.

Material immortality also makes sense out of chaos and suggests design amid seeming disorder. For example, of the many creatures on the reef, Carson notes that some are important "in the geologic processes of earth building and earth destruction" which include "the processes by which rock is worn away and ground to sand, by which

the sediments that carpet the sea floor are accumulated, shifted, sorted, and distributed" (TETS 221-2). These examples of material immortality suggest that housekeeping activities are an important part of caring for the world. Even elemental bodies participate in such matters as when Carson claims that, for "millennia beyond computation, the sea's waves have battered the coastlines of the world with erosive effect, here cutting back a cliff, there stripping away tons of sand from a beach, and yet again, in a reversal of their destructiveness, building up a bar or a small island" (TSAU 122). For Carson, the great realities of the natural world included care giving and housekeeping and issues that ultimately connect material immortality in nature with the work of mothers in human society.

In my mind, there are two reasons why critics have missed the matrilineal and maternal qualities of material immortality, and my discussion of Carson's ethic of caring and her critique of gender in the remainder of this chapter will respond to both of them. The first reason is because some have misconstrued Carson's role within her household by precluding or erasing her involvement and investment in domestic and care giving activities. I will address this trend now and return to the second reason, which involves a certain loathing for opening "theory's Pandora's box of essentialism" (Fuss, Essentially Speaking 19), soon after. As far as the former, there are some startling differences in the way Carson's role within her family has been recalled and described. For McCay, Carson's role in her family was like that of an older sister (16). Gartner asserts that after her husband died, "Mrs. Carson kept house, helped with the correspondence, and did her daughter's typing" while Rachel Carson earned a living for herself and her mother (10), although Marcia Myers Bonta more correctly claims that throughout her adult life, Carson supported "a family as large as many men at that time did" (264). Gartner's assessment is repeated by Lear when she reports that during the difficult time following Marian's death, the Carsons struggled through with Maria working as the housekeeper

and Rachel working as the breadwinner (WFN 84). These descriptions are appropriate in some ways, but they also suggest a level of detachment and independence that is misleading.[13] Moreover, identifying Carson as the family breadwinner (and Maria as the housekeeper) assumes a partnership based on the division of labor traditionally found in heterosexual pairs in patriarchal society.[14] By perpetuating a myth that Maria released Rachel from the time-consuming, exhausting, and frequently tedious tasks associated with domestic life, scholars leave unsaid and unexamined the ways in which theirs was a cooperative partnership that transcended dominant heterosexist models for adult relationships. That adult women together might participate in associations that neither mirror nor mimic heterosexual models has not been imagined.

Unlike her fellow breadwinners of the 1950s (a category almost exclusively comprised of men), Carson was not rewarded with personal space and leisure time in exchange for working outside the home, nor did her financial contributions ameliorate or even significantly reduce the care giving and domestic responsibilities required of her within the home. Late in her life (after her mother's death), Carson was asked during an interview why she'd never married. She was both cagey and cautious when she responded that she had never had the time and added "that she sometimes envied male writers who married because they had wives to take care of them, provide meals, and spare them from unnecessary interruptions" (Lear, WFN 429-30). Further unlike her colleagues who were men, Carson confronted more general sexist assessment and obstruction in her career and professional life. According to Vera Norwood in Made from this Earth: American Women and Nature,

> Rachel Carson wrote during a period in American culture when home, and women's place therein had much symbolic meaning. Women indeed worked for wages in the public arena, but such work was decidedly secondary to their contributions within the separate, private sphere of

> household [and] contradictions between women wage earners and this celebration of the homemaker usually were invisible. (164)

In chapter five, "Science, Sisters, and the Sea: Rachel Carson and her Refusal to be Silent on Matters of Science in the Sea Books," I will look specifically at the ways in which Carson and other women in science have tended to be devalued and tracked into fields determined by roles assigned their gender. Here, I want to stress that because she never claimed the patriarchally authorized labels of wife or mother, scholars have not only severely underestimated the extent to which Carson's time was consumed with domestic matters and her life directed by quotidian care giving duties, but they have missed significant opportunities to engage these issues in her writing.[15]

Lear's 1992 biography, Rachel Carson: Witness For Nature, has done much to fill in the enormous gaps in what had previously been understood as the circumstances of Carson's life. She provides significant insight into the issues that were of importance to Carson, issues that in turn became driving forces behind both the content and narrative structure of the sea books. Lear includes an amazing amount of detail and demonstrates again and again that throughout her life, Carson's responsibilities to care for others increased rather than abated. While caring for others can be immensely rewarding, on a routine basis, it is a laborious, time-intensive, and frequently messy business. When Maria was fit, she may have handled the greater share of housekeeping duties, but Rachel was as likely to be called upon to look after sick or infirm family members as not.[16] A friend who visited Carson and her family in the fall of 1930 (which at that time included her parents, older sister Marian, and nieces Virginia and Marjorie), recalled that "Marian's two little girls clung to Rachel, talking incessantly until she gave in and read them a story, after which they went off for a while to play" (Lear, WFN 71). Carson remained close to her nieces (Marjorie in particular), raised them (along with her mother) after their mother died, continued to contribute to their

financial care and well-being after they were adults, and finally, adopted Marjorie's young son Roger after her untimely death in 1957, at age 31.

According to Lear, following Marian's death, Carson "inherited not only increased financial obligations but also an altered domestic life that deprived her of privacy and drained her physical and emotional energy" (WFN 84). She was not released even from the care of an older brother, Robert, who expressed very little concern for her; Carson may have paid for minor surgery for him, and she almost certainly helped tend him afterward (Lear, WFN 515n43). Later, when she was making painfully slow progress on The Edge of the Sea, in part because she spent "hours taking care of her mother, helping [Marjorie], who was going through some difficult times, and seeing to baby Roger's care," Robert did not offer to help her out or provide any relief whatsoever (Lear, WFN 253).[17] Finally, even when Carson wasn't providing direct care, she was frequently preoccupied with the emotional well-being of those she loved. She went to great lengths to protect her niece from both public scandal and a high-risk pregnancy resulting from an affair with a married man.[18] Moreover, Carson had great affection and sympathy for her brother's second wife, Vera. As reported by Lear, although Robert eventually became gainfully employed and earned a decent living, he neglected his wife and denied her money to spend on herself; In gestures that seem enormously generous given her own financial situation–not to mention a difficult relationship with Robert–Carson frequently invited them to the book parties arranged by her publishers and used those occasions as excuses to get Vera some nice dresses (WFN 526n17). Clearly, caring for others was a concern central to Carson's being in the world and occupied much of her time and energy.

Carson expressed caring concern for her readers using a variety of means. Illustrating eternal cycles and enduring rhythms, Carson's quiet competence and gently persuasive prose provided intellectual stimulation for readers, but also emotional and

spiritual sustenance as well. Under the Sea-Wind begins and ends in the spring (Gartner 38-9) and Carson notes in The Sea Around Us that in the sea, "as on land, spring is a time for the renewal of life" (30). Carson explains that "the symbols of hope are not lacking even in the grayness and bleakness of the winter sea" (TSAU 35), and that comfort can be achieved through a conscious shifting of perspective. She explains in a direct address to readers:

> On land we know that the apparent lifelessness of winter is an illusion. Look closely at the bare branches of a tree, on which not the palest gleam of green can be discerned. Yet, spaced along each branch are the leaf buds, all spring's magic of swelling concealed and safely preserved under the insulating, overlapping layers [. . .]. So, too the lifelessness, the hopelessness, the despair of the winter sea are an illusion. Everywhere are assurances that the cycle has come to the full, containing the means of its own renewal. (TSAU 35-6)

Carson highlights the ways in which cycles of life and death, hopelessness and despair are balanced by regeneration and renewal. Directing readers to observe these cycles in the natural world provides a roadmap to find signs of continuity even in apparent desolation and encourages them to locate themselves within cycles that include both trial and relief.

Another example of a reflection that reinforces a certain comfort in continuity, particularly in the face of adversity, occurs in The Edge of the Sea. Carson claims that the very existence of mussel fields in the low-tide zone is evidence of an unbroken chain of circumstances that has proceeded to its consummation untold millions upon millions of times, but for each mussel that survives, untold millions of larvae are spent. For Carson,

> [t]he system is in delicate balance; barring catastrophe, the forces that destroy neither outweigh nor are outweighed by those that create, and over the years of a man's life, as over the ages of recent geologic time, the total number of mussels on the shore probably has remained about the same. (TETS 92)

Rather than a direct appeal to readers, Carson inserts the human perspective of a man into this passage. In addition, the cycles of regeneration and renewal invoke images of reproduction and birth, suggesting that the "man" is not alone. Even so, Carson includes plenty of examples of continuity that have broad, genderless appeal. For example, continuity is established when Carson recognizes the repetition of ancient patterns and the "recurrence of earth processes of an earlier day. Now, as then, living reefs are building up offshore; sediments are accumulating in shallow waters; and the level of the sea, almost imperceptibly but certainly, is changing" (TETS 196-7). She makes a similar connection when she claims that "we are still in the warming-up stage following the last Pleistocene glaciation" before predicting (based on past cycles) that "the world's climate, over the next thousands of years, will grow considerably warmer before beginning a downward swing into another Ice Age" (TSAU 184). Inexorable changes in the depth of the sea, the constitution and location of the coasts, and climate may provoke anxiety and concern, yet Carson positions such events along a comforting continuum of ongoing and ever present cycles.

For Gartner, the symbolism that Carson finds in the natural world does not consist of symbols "in the usual sense of things standing for concepts, but as particular, ephemeral activities providing knowable prototypes for 'timeless' activities that have been repeated throughout the life of the earth" (38). But there is a way in which these prototypes do communicate symbolic meaning for many readers, particularly in terms of

continuity and continuance. Carson's readers responded to these caring reminders because, according to Lear,

> [a] nation fearful of the escalating nuclear arms race, made nervous by Joseph McCarthy's hunt for domestic Communists, and reluctant to send their sons to fight a war in a far-off Pacific nation like Korea found in The Sea Around Us a longer perspective on their problems and a larger dimension by which to measure human achievement. (WFN 205)

That her writing continues to offer comfort for contemporary readers is evident in Emily Wilson's acknowledgement that she turns to re-reading The Sea Around Us because she needs "to escape up-to-the-minute news" of the world in chaos (Wilson 40). On a fall morning in the late 1990s, she recalls an oppressively hot summer when she could not avoid images of the ravages of wars around the world (the first round of American involvement in Iraq, escalations in Somalia, horrifying revelations in Yugoslavia), set against the spectacle of President Clinton's sex scandal. For Wilson,

> How the young planet Earth acquired an ocean did not appear to interest the stock market, rising and falling, falling and rising, for brokers were said to be tearing out their hair over one day's losses as a charred century wobbled, if not plummeted, toward a new millennium. (40)

She is lulled by the beauty made possible by the science in The Sea Around Us, and imagines that the natural world is a source of solace, and it is Carson's writing that makes that connection. Carson extends her ethic of caring into action by reaching out to readers, encouraging them to turn to her and to turn to each other. Signaled subtly but insistently with a collective "we," in many of the passages I've highlighted, and even more throughout the sea books, Carson works (us) through some of the most difficult realities of life. [19]

Carson further reinforces a caring connection between writer and reader by assuming an almost parental posture in her writing. Though she wrote for a primarily adult readership, she periodically incorporated wondrous tales and fanciful images such as when she refers to "the magic of chlorophyll" (TSAU 8) and describes colonies of rockweeds or sea wracks as:

> a fantastic jungle, mad in a Lewis Carroll sort of way. For what proper jungle, twice every twenty-four hours, begins to sag and lower and lower and finally lies prostrate for several hours, only to rise again? Yet this is precisely what the rockweed jungles do. (TETS 73)

For Carson, tide pools contain "mysterious worlds within their depths, where all the beauty of the sea is subtly suggested and portrayed in miniature" (TETS 110). She is enchanted by fairy caves and elfin starfish (TETS 3) and calcerous sponges are comprised of a delicate "mesh of fine threads—a web of starched lace made to fairy scale" (TETS 122). Even the "hordes of small carnivores, the first link in the chain of flesh eaters are "fierce little dragons" (TSAU 19-20) and she tells a story of a familiar scene turned fantastic, when she explains that in darkness, big crabs possess the shores:

> One night when the tide was ebbing I went down to the low-tide world to return a large starfish I had taken in the morning tide [. . .]. Boldly and possessively [the crabs] inhabited the weed-shrouded rocks. All the grotesqueness of their form accentuated, they seemed to have transformed this once familiar place into a goblin world. (TETS 100)

She shares puckish delight of an encounter with an elfin being that turns out to be a sea hare, and its larger, West Indian cousin "which seemed to belong in some book of mythology" rather than on the shore (TETS 220). These references may reflect Carson's own sense of wonder toward the natural world, but the whimsical language

suggests the intimate exchanges between caregiver and child and evokes a safe, emotional space reminiscent of childhood.

While there is nothing in these examples that suggests gender-specific attitudes or behavior, many of the strategies Carson employed to express caring regard or an ethic of caring during the 1940s and 1950s, would have been understood by her readers as feminine, womanly, maternal. During the same years, the status of women's role as caregivers was increasingly undermined by professional experts until traditional positions of power for women were seriously devalued and all but denied. According to historians Bonnie Anderson and Judith Zinsser, the march to mid-twentieth century brought many changes for women and their socially sanctioned roles:

> Not only did mother no longer "know best" how to raise children, now her practices were ridiculed or condemned as ignorant and harmful. By identifying women primarily as mothers and simultaneously diminishing the mother's ability and authority, doctors and psychologists undercut woman's traditional territory without offering her more room in what was still seen as a "man's world." (220)

During the same years, scientists would round out this professional trifecta by simultaneously praising women's role as nurturers at the same time characterizing domestic activities "as prescientific practices, awaiting the emancipatory certainty of scientific knowledge" (Rose 70). According to Hillary Rose in "Beyond Masculinist Realities: A Feminist Epistemology for the Sciences," it was a successful if cyclical catch-22 whereby "one arrogant objectivising science [sought] to instruct women in caring practices while another objectivising science [saw] them as inherently female" (70). Carson challenged and reversed this trend in the sea books by valuing the set of traits associated with motherhood and mothering, while maintaining caring as a broad category affixed neither to gender, nor to sex.

Even though Carson consistently promoted caring as a vital social function in the natural world, she was certainly aware that women shouldered the majority of the burden of taking care of others in the world of men. In another turn of the cycle of life, Maria, who had been Carson's partner and best supporter, became increasingly dependent on her daughter and by the early 1950s, Carson was unwilling to leave her mother "alone for more than two nights at a time" (Lear, WFN 225). According to Lear, by 1953,

> [t]he companionship she had known with her mother for so long was no longer available to her nor especially comforting. Maria Carson's emotional demands upon her daughter increased as her physical powers diminished. Rachel was now her mother's caretaker. (WFN 248)

Carson was increasingly required to alter her plans or make complicated arrangements to accommodate those who depended on her. After Maria suffered a frightening fall at their remote cottage in Maine, Carson determined that her mother could not continue without assistance, nor could she be left alone except for the briefest periods of time (Lear, WFN 293). Such responsibilities thwarted many of Carson's plans and required her to sacrifice her desires on more than one occasion.[20] In addition, family responsibilities increasingly shaped the relationships she could cultivate and maintain with those outside of her family.[21]

During the summer of 1954, Rachel was brainstorming ways to lighten her "domestic situation to give her more personal freedom and more time for her writing" (Lear, WFN 263), and by the summer of 1956, the situation was much worse. According to Lear, Carson would never again "be free of nearly crushing family responsibilities or able to call her time her own even to the limited extent she had" in the few preceding years; instead, her personal and creative life would be more and more circumscribed and "the despair that accompanies powerlessness would become a daily adversary" (WFN 289). By suggesting that care giving is a shared responsibility in the sea books,

Carson imagines a radically different social order than she witnessed in her life. Perhaps Carson's greatest tribute to her mother was to elevate caregivers while leavening the burdens required of women in the uneven divisions of domestic labor between men and women in patriarchal society.

For Rose, it was "not entirely by chance that the scientific and popular contribution to the defense of the environment and humanity's place within it should have been made by a woman biologist and writer" (65). Norwood argues along a similar line that Carson "consciously supported and drew upon women's interest in protecting their families, neighborhoods, and the country from threats posed by the 'artificial world' of post-World War II America" (155). There are those who view Carson's work as validating the domestic sphere and recognizing important connections to women's past. There are also those who fear that such connections reinforce essentialist notions that circumscribe women's place in the social world. But connections between socially constructed gender roles and the seeming essentialist categories of sex are not nearly as clear or precise as has been imagined. According to Diana Fuss in Essentially Speaking: Feminism, Nature and Difference,

> Essentialism is not, and has rarely been, monolithically coded [and] the repeated attempts by [. . .] philosophers to fix or to define essence suggests that essence is a slippery and elusive category, and that the sign itself does not remain stationary or uniform. (20)

Those who advocate the social construction of identity as well as reality, maintain that what appears to be natural is really the product of social forces, while those who promote the efficacy of essentialism claim that elements deemed natural are actually repressed by social ideology and institutions (Fuss, Essentially Speaking 3). Even though essentialism tends to evoke rancor among contemporary feminists (Grosz 86), that has not always been the case. In "'Life' as We Have Known it: Feminism and the

Biology of Gender," Lynda Birke describes how first wave feminists extolled the superiority of women in order to argue for suffrage and better education for women. Like Mary Wollstonecraft in the eighteenth century, nineteenth century feminists believed that education enabled women to be better mothers, and access to political discourse was required to effect social change reflecting their interests and those of their families (Birke 253).[22]

Social constructionism holds much sway among second wave feminists and many are leery of attempts "to define or designate women or femininity" because such attachments seems to rely "on commitments that generalize on the basis of the particular and reduce social construction to biological preformation" (Grosz 93). Thus, characterizations of women that move from the particular, historical, cultural, ethnic and class positions of individual women to more abstract observations tend to be dismissed as essentialist. For Elizabeth Grosz in her essay, "Sexual Difference and the Problem of Essentialism," contemporary academic feminists are charged with the daunting and unenviable task of maintaining a perspective that is critical of patriarchal ideology and epistemologies while relying on its resources and participating in its institutions. In other words,

> feminists have had to tread a fine line either between intellectual rigor (as it has been defined in male terms) and political commitment (as feminists see it)—that is, between the risks posed by patriarchal recuperation and those of a conceptual sloppiness inadequate to the long-term needs of feminist struggles—or between acceptance in male terms or commitment to women's terms. (Grosz 82)

Scholars who have been reluctant to identify Carson's critical deployment of maternal, matrilineal, domestic and care giving issues, as well as scholars who have been dismissive of those who do, mistakenly assume that Carson's engagement of such

issues is implicated with the ideologies that depreciate and undervalue matters traditionally attributed to women.[23] Carson, who did not identify herself as feminist,[24] successfully navigated this treacherous territory in the sea books with descriptions and characterizations of body knowledge and body rhythms.[25]

Unlike the complex systems of interdependent relationships that ensure the perpetuation of life, bodies are rather simple, driven by instinct and impulses resulting in repetitive movement. Not one to underestimate the importance of body knowledge, Carson frequently describes such movement like a ritual dance. For example, she notes that on beaches "inhabited by ghost crabs, their burrows appear and disappear in a daily and seasonal rhythm related to the habits of the owners" (TETS 160). In Under the Sea-Wind, Carson describes migration as a fever (76) and instinct as a blind but powerful drive that periodically and unequivocally takes over the body as it does once a year for the eels of Europe and eastern America. The story of one eel reveals this cyclical and eternal pattern. Carson explains that

> A strange restiveness was growing in Anguilla the eel. For the first time in her adult life, the food hunger was forgotten. In its place was a strange new hunger, formless and ill-defined. Its dimly perceived object was a place of warmth and darkness—darker than the blackest night over Bittern Pond. She had known such a place once—in the dim beginnings of life, before memory began. (UTSW 213)

For creatures such as eels, memory and knowledge are contained in the body and expressed through instinctual movement. This is behavior essential to survival but not grounded in living memory or mind knowledge. For the juvenile eels born of the abyss, "every activity of their small and glassy bodies [is] directed unconsciously toward the attainment of a goal unknown in their own experience—something stamped so deeply upon the memory of their race" that each returns without hesitation or confusion to the

habitats of their ancestors, whether west towards America, or east towards Europe (UTSW 267). Here, memory is collective as well as unconscious.

Body knowledge may be incredibly involved, as in the case of intergenerational migration of eels, or body knowledge might be as distinct as an impulse, as in the case of Convoluta. In an aquarium, outside its typical tidal habitat, Convoluta continues to perform simple movements nearly ritualistic in their regularity. Carson explains that,

> twice each day Convoluta rises out of the sand on the bottom of the aquarium, into the light of sun. And twice each day it sinks again into the sand. Without a brain, or what we would call a memory, or even any very clear perception, Convoluta continues to live out its life in this alien place, remembering, in every fiber of its small green body, the tidal rhythm of the distant sea. (TSAU 162-3)

Bodily knowledge, like that which causes Convoluta to perform its daily dance and informs the direction of migrating eels, shrimp and birds is as central to Carson's work as material immortality. And, like material immortality, bodily knowledge can contain important and profound implications for humans, particularly in reference to sexual difference and gender distinction.

Even though bodily cycles and rhythms are generally associated with women in Western cultures, Carson steadfastly destabilizes rigid and patriarchal categories of gender by refusing to attach bodily activities to specific sexes, by promoting bodies with ambiguous or neutral sex (particularly in regard to bodies that protect and shelter others), and by providing alternative reproductive and care giving models. As an example of the last point, although she was a biologist, Carson was surprisingly uninterested in matters of sexual reproduction and birth. Of the three sea books, there are scant few references to birth and the few that occur are metaphorical as opposed to actual cases. These include her rendering of the birth of the moon and the birth of an

island, contained for the most part in one chapter, in one book, "The Birth of an Island" in The Sea Around Us. Even though the process of giving birth might seem an experience exclusive to (some) women, like other bodily experiences that appear self-evident and immediately perceptible, "they are always socially mediated" (Fuss, "Reading Like a Feminist" 100). In the sea books, Carson is careful to describe such experiences in ways all people can imagine.

Carson chooses subjects of mineral and rock that resist the opportunity to essentialize when she describes "a process seemingly so destructive, so catastrophic in nature" that ultimately results in an act of creation (TSAU 84).[26] She explains that over a period of many millions of years, a young earth evolved from a whirling mass of gases into a molten mass of liquid material, before slowly cooling into the more recognizable solid state we enjoy today. While the outer shell was in an intermediate liquid state, the earth's rotation caused planet-wide tides evocative of contractions and Carson claims that "the moon itself may have been born of a great tidal wave of earthly substance, torn off into space" (TSAU 5). Carson's explanation is both scientifically appropriate and quite epic.

> Those who believe that the moon is a child of Earth say that during an early stage of the earth's development something happened that caused this rolling, viscid tide to gather speed and momentum and to rise to unimaginable heights [. . .]. Physicists have calculated that, after 500 years of such monstrous, steadily increasing tides, those on the side toward the sun became too high for stability, and a great wave was torn away and hurled into space... This is what we call the moon. (TSAU 5-6)

Carson's explanation is communicated completely without reference to sex or gender—not in the moon child, the earth parent, those who believe, or those who know. Not even the physicists are marked by gender in the passage above. Thus, Carson

universalizes the experience of birth without reducing it to either sexed or gendered essence.

Advancing this lack of commitment to sex and gender even further, Carson directly connects the wrenching and violent components of birth with wide cycles of continuity and constancy. Almost immediately following its separation from the body of earth, "the newly created satellite became subject to the physical laws that sent it spinning in an orbit of its own about earth" (TSAU 6). Closer to home and with an example from modern memory, she describes successive generations of islands. Carson begins by explaining that the "birth of a volcanic island is an event marked by prolonged and violent travail [with] the forces of the earth striving to create, and all the forces of the sea opposing" (TSAU 84). With great regularity, the earth succeeds and an island is born. As with living things, islands are destined to return to the sea and while some islands remain stable for years, there are other "little, stillborn islands, [that are] doomed to only a brief emergence above the sea" (TSAU 85). The emanation of the island of Krakatoa in the Indonesian Sundra Straight between Java and Sumatra is obscured in the distant past, although in its recent ruin, it became known to the entire modern world. According to Carson, the eruption that ensued "gave rise to a hundred-foot wave that wiped out villages along the Strait and killed people by tens of thousands" (TSAU 87). But even here, creation followed destruction when in 1929, another volcanic island rose in its place. The new island was called Anak Krakatoa or Child of Krakatoa (TSAU 87). While she relies heavily on images of birth and labor in these descriptions, neither gender nor sex are in evidence.

Carson provides fascinating alternatives to the violent contractions and heaving eruptions involved in the creation of islands in the silent, mysterious mangrove, a tree with "a life force strong enough to alter the visible face of its world" (TETS 239-40). Mangroves are classified by botanists as spermatophytes, a group of plants identified by

male sex characteristics, yet they wield the power of procreation and birth.[27] According to Carson,

> [a]s the corals dominate the seaward margin of the [Florida] keys, the mangroves possess the sheltered bay shores, completely covering many of the smaller keys, pushing out into the water to lessen the spaces between the islands, building an island where once there was only a shoal, creating land where once there was sea. (TETS 240)

Young mangroves anchor themselves by sending out searching and circular networks of roots. As the tangle of roots becomes established, all sorts of debris from decaying vegetation, driftwood, shells, coral fragments, and uprooted sponges settle over them. In an exhilarating reversal, Carson concludes that from "such simple beginnings, an island is born" (TETS 242). Thus, Carson shows an ostensibly masculine subject in a position typical for a female body.

There is another important trend supporting Carson's resistance to essentializing ideologies. In the sea books, she emphasizes bodies that protect and shelter life over bodies that produce life.[28] On the rocky coast calcareous sponges that appear inconceivably fragile, are able to exist and thrive under the surging thunder of surf that regularly fills the caves and tide pools they inhabit (TETS 122). Carson speculates that perhaps seaweeds are the key to their successful survival, with resilient fronds providing "sufficient cushion for all the minute and delicate beings" that live among them (TETS 123). In similar fashion elsewhere along the coast, rockweed hangs in heavy curtains from sheer rock walls twice a day in tune with the tides, "holding the wetness of the sea" so that "nothing under their protective cover ever dries out" (TETS 73). Such references include both plant and animal bodies, although of the animal bodies that shelter and protect, Carson lists a host of creatures with ambiguous sex or no sex at all, such as jellyfish, snails, and sponges. For example, the great jellyfish Cyanea "moves through

the sea with rhythmic pulsations, trailing long tentacles and [. . .] shepherding a little group of young cod or haddock, which find shelter under its bell and travel with it" (TSAU 32). Aurelia, the moon jellyfish, issues a powerful sting that is dangerous to most sea creatures and even for human bathers, yet their broad bodies offer safe harbor for a host of others:

> young cod, haddock, and sometimes other fishes adopt the great jellyfish as a "nurse," travelling through the shelterless sea under the protection of this large creature and somehow unharmed by the nettle-like stings of the tentacles. (TETS 88)

The one gendered signifier in this passage ("nurse") is highlighted as alien, thus reinforcing the artificial construction of gender as well as again excluding gender as a significant defining category for caring.

While some critics have noticed Carson's identification and descriptions of non-traditional reproductive and care giving structures, they fail to identify the extent to which she privileges such alternative arrangements. For example, Gartner observes that in cases where "particular sex roles differ from the usual, Carson notes the facts, as she would any other information [. . .]. This juxtaposition makes us realize that either way is normal" (37). However, Gartner fails to notice that Carson illustrates "the usual" sex roles infrequently, if *ever.*[29] Furthermore, Carson is less interested in the sexual of component reproduction than in exposing alternative models for parenting and care giving. Throughout the sea books, she consistently resists heterosexual models in her discussions of reproduction and parenting. She does so in a variety of ways: by highlighting asexual or alternative modes of reproduction, promoting gender ambiguity among parents, and presenting a variety of care giving arrangements—frequently at the same time or in rapid succession.

Examples of each of these trends are easy to locate in the sea books. Carson explains that an individual sea hare, "is both male and female; it may function as either sex, or as both," that the composite creature Velella is "the multiple offspring of a single fertilized egg," that the pipefish is "developed, nurtured, and reared beyond the stage of helpless infancy by the male parent, who keeps his young within a protective pouch," and that the "famed palolo worm of the South Pacific" is stimulated literally by moonlight, and not by a partner of an opposite sex (TETS 221, 170, 233, 205). While the palolo is generally repelled by light, adults are periodically drawn to the glow of the full moon to perform an incredible reproductive ritual:

> The worms back out of their burrows, thrusting out the swollen, thin-walled posterior ends, which immediately begin a series of twisting movements, writhing in spiral motions until suddenly the body breaks at the weak point and each worm becomes two. The two parts have different destinies—the one to remain behind in the burrow and resume the life of the timid forager of the dark hours, the other to swim up toward the surface of the sea, to become one of a vast swarm of thousands upon thousands of worms joining in the spawning activities of the species. (TETS 205)

Reproduction for the palolo worm is extraordinarily orgiastic, although entirely asexual. Their moonlit activities zenith literally when the first rays of the morning sun stimulate them further until, twisting and contracting, "their thin-walled bodies burst open, and the eggs from some and the sperm from others are cast into the sea" (TETS 205). Carson communicates the palolo's reproductive cycle in great detail and with much verve, demonstrating that her studied indifference to sexual reproduction (mentioned earlier) does not translate into a lack of interest in either reproduction or sexual pleasure at large.

There are others creatures in addition to the palolo worm who are pushovers for moonlight. Indeed, there are many more "belonging to quite unrelated groups throughout the whole range of sea life, [that] spawn according to a definitely fixed rhythm that may coincide with the full moon or the new moon or its quarters" (TETS 35). For example, some sea urchins are linked in mysterious ways "with one of the great rhythms of nature" and spawn only during the full moon (TETS 222). As we shall see in the next chapter, Carson could have a romantic and even erotic response to moonlight herself, yet she mostly retains the clarity of a scientific outlook when she reports reproduction related to the lunar cycles may be produced "by the altered pressure of the tides or the changing light of the moon" and the evidence for one or the other is by no means certain (TETS 35). In addition to providing the atmosphere necessary for some creature's reproductive activities, moonlight offers almost parental protection for the small plumed tube worm, Spirorbis. Carson explains that,

> [e]very fortnight, on the moon's quarter, a batch of eggs is fertilized and taken into the brood chamber to begin its development. And at the same time the larvae that have been made ready during the previous fortnight are expelled into the sea. By this timing [. . .] the release of the young always occurs on a neap tide, when neither the rise nor the fall of the water is of great extent, and even for so small a creature the chances of remaining within the rockweed zones are good. (TETS 83)

Here, the method of reproduction is indefinite and ambiguous, but lack of sexual specificity combined with the image of a repetitive cycle providing safety and continuance is certain and explicit.

Finally, although Carson recognizes that all life has been born of the sea, she most frequently promotes the body of the sea as a protective, nurturing, shelter. She informs readers in The Sea Around Us that in spring, "surface waters become a vast

nursery" (31) and assures them in Under the Sea-Wind that although Scomber is "obviously an unfinished little fish," the sea will care for him "as it cares for the young of all other fishes, and of oysters and crabs and starfish, of worms and jellyfish and barnacles" (126, 115). Although the sea is sometimes a vessel for reproduction, it is only so as a result of asexual activities, like for the palolo worms above and for brown ribbons of kelp, undulating in the sea currents and oblivious to the thriving communities beneath it. Each strand of kelp lives its own life, "growing, replacing torn tissues as best it may, and in season sending clouds of reproductive cells streaming into the water" (TETS 65). Also in their season, jellyfish bud off formless polyps clinging to rocks at the bottom of the sea and rise into the surface waters. Despite their decidedly vegetative beginning, there is nothing passive about their will to live. Carson explains,

> There is unconscious purpose in the sluggish forms of the copepods hibernating on the bottom, safe from the surface storms, life sustained in their tiny bodies by the extra store of fat with which they went into this winter sleep. (TSAU 36)

The deep sea bears the developing jellyfish so that they will survive and emerge as the next generation. Though the sea is necessary to the perpetuation of many reproductive and other life cycles, it is not in support of sexual reproduction. Thus, the sea is the greatest mother of all not because it produced (or produces) life, but because its sexless, genderless body shelters and protects those within it and those that move through it. It is a significant and meaningful distinction.

Carson's family was as close to matriarchal in construction as it gets in patriarchal society. Such an acknowledgement not only adds a context necessary for understanding her life, but offers an important key for unlocking the radical perspectives portrayed and demonstrated in her sea books. Analysis of the sea books in light of this context reveals not only Carson's consistent and mindful inclusion of matrilineal and

maternal themes, but suggests that these themes are deployed in ways that successfully destabilize rigid categories of sex and gender. Her perspective was progressive when she released the sea books, and many of the values conveyed in Carson's writing are evident in the details of her life. Her observations of the natural world and her critique of patriarchy and ideologies of oppression remain relevant even today. Even though much of her writing was produced collaboratively with her mother, there are few models available to describe the dynamic partnership between Rachel and Maria, and indeed, biographers have been confounded trying to characterize it.[30] As I will show in the next chapter, biographers have been similarly stymied in their assessment of other relationships that enriched Carson's life and contributed to her work.

According to Carolyn Heilbrun, because of the grave deficiency of models to draw from, recent biographers of women have been required to "reinvent the lives their subjects led" (Writing a Woman's Life 31). She explains that,

> [w]omen have been seen to support one another in the crises of their lives, particularly in those family crises so central to a woman's experience of marriage, birth, death, illness, isolation. From the love of women for one another as they work and live side by side, however, recorders of civilization have, until the last decade, averted their eyes. (Writing a Woman's Life 98-9)

Biographies, as a generic class, have been shaped by the lives of men, living large and performing public action in the world. Assumptions have been made about women's stories—they are seen as intimate, domestic, and uninteresting. Heilbrun argues that it is "no wonder that biographers have largely ignored women as subjects, and that critics of biography have written as though men were the only possible subjects" (Writing a Woman's Life 21). Such an assumption is evident in McCay's striking observation that several of Carson's early biographers compared her life unfavorably with Henry David

Thoreau, whose "solitary existence at Walden Pond is extolled while her reclusive life, her attempts to find a quiet spot away from the rest of the modern world, were viewed as spinsterish and narrow" (88). While recent biographies of Carson, including McCay's as well as Lear's have provided vital details, acknowledged Maria's influence on her daughter, and introduced significant relationships, neither escapes reliance on stereotypes in their depiction of those details and relationships.[31]

It is my belief and my expectation that feminists will continue to locate examples of women who have worked cooperatively, creatively, and productively with and among other women in history. In Lesbian Origins, anthropologist Susan Cavin imagines that "the first enduring social relation" may have been between women, as mothers and daughters, sisters, or in cooperative associations with non-kin mothers for shared purposes of protecting young and providing food (Cavin 42). From this perspective and because women continue to be the primary nurturers of children and caregivers in families, Cavin concludes that "society is utterly dependent upon women's relationships for its existence and sustenance" (Cavin 62) and that "female society is the constant base of all societies, even patriarchies" (Cavin 4). In the next chapter, I will turn to a detailed examination of Carson's involvement and participation in a productive and loving community of women, as well as the importance of her perspective as a woman-identified-woman and lesbian. For now, I will continue to explore the first relationship in Carson's life, the relationship with her mother.

In 1954, Carson declared that her love of nature had been inherited from her mother and it was a love they shared throughout their lives together (Lear, WFN 7-8). Theirs was a relationship of pith and mettle and Maria Carson cultivated a connection to nature for her daughter that was both passionate and disciplined. Carson always "responded emotionally to her mother's love of nature" and her "acuity of observation and her eye for detail were shaped" by her mother, beginning with their earliest forays

into the woods (Lear, WFN 16). They grew to be amicable companions who continued to enjoy a deep commitment to their shared interests. During their summers in Maine, many evenings were spent "on the deck above the water listening to the tide and the birds settling in for the night and watching sunsets" (Lear, WFN 245). Toward the end of her life, Maria would nap in her wheel chair next to Rachel's study while she worked, and Carson's research assistant and friend Bette Haney recalled being "impressed by Rachel's caring and reverential attitude towards her mother" (Lear, WFN 327). In the winter of 1959, Maria died with her daughter by her side, holding her hand. It was the "saddest Christmas [Carson] had ever known" (Lear, WFN 338). She would recover and continue to write for, according to Lear,

> [i]f there was a great emptiness for Rachel in the loss of her mother, these was an equal legacy of determination to carry on their mutual crusade. Carson's sense of mission was deepened by her mother's belief in the importance of their shared vision. (WFN 339)

Following the death of her mother, Carson's life was anything but empty. She cared for her adopted child while she grieved, and by mid-January, Carson went back to work.

Maria was Carson's "first mentor [and] her best friend as well" (Lear, WFN 31). She helped her daughter develop the strong sense of self necessary to pursue her career in science, sustained and supported her, and contributed collaboratively to Carson's writing while she was alive. Still, their relationship remains largely unacknowledged and significantly underestimated. According to Hynes, the mutually creative friendship Carson enjoyed with her mother doesn't count because "women together are women alone" and fifteen years after these words were published, it remains true that relationships between women are understood as "relationships by default not by choice" (RSS 62). Maria's "companionship as a teacher and partner brought with it an obligation to help others see and to share in the wonder [of the natural

world]" (Lear, WFN 26), although perhaps Maria's most enduring legacy to her daughter, "in addition to a love of ideas and a feeling for nature" was the capacity to love Mary Scott Skinker and other women in Carson's life (Hynes, RSS 61). In the next chapter, "Parting Fronds and Probing Fingers: Rachel Carson Takes her Love to the Sea," I will look closely at this legacy, suggest that it contributed to Carson's perspective as a woman-identified-woman, and finally, allowed her to express and enjoy herself as lesbian (even if covertly). Together, Rachel and Maria produced an almost inseparable and dialectical stream of consciousness, values, and perspectives.

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1 Despite biographical accounts to the contrary, especially those that portray her as a recluse or a loner, Carson was a highly social person who enjoyed an extremely dynamic and integrated private life. In this chapter, I focus almost exclusively on Carson's relationships within her family and her relationship with her mother in particular. In chapter three, "Parting Fronds and Probing Fingers: Rachel Carson Takes her Love to the Sea," I will introduce some of the other important, influential, and intimate connections Carson cultivated and maintained during her life.

2 This point is even more significant in the next chapter when I advance the notion that Carson was lesbian. Here, it is important to acknowledge that I differ on a position popular with many of Carson's biographers regarding characterizations of Carson's mother. While some biographers have referred to Maria as cloying, manipulative, and overbearing, I think such portrayals are stereotypical, dismissive, lack imagination, and are frequently attached to brilliant, driven women unfairly. I address issues faced by Carson's biographers as well as the misconceptions they have perpetuated in chapter three.

3 Lear notes that married women "were not permitted to teach school in those days, so when twenty-five year old Maria agreed to marry Robert Carson, she had no choice but to give up her career" (Lear, WFN 11). Interestingly, it was a choice that Dorothy Murdoch would be made to make a generation later when she left teaching to marry Stan Freeman (Lear, WFN 247).

4 Rachel's siblings were older than her and while emerging from apparently similar circumstances, their lives were quite different. Marian was born in 1897, Robert two years later, followed by Rachel in 1907. According to Lear, the older two children were rebellious and impulsive, leading toward inevitable and serious personal problems—the kind that "even the resilient daughter of a Presbyterian minister never expected to confront" (WFN 22, 31). When marriages soured, during periods of unemployment, and to recover from various excesses, one or both sought respite in the Carson home, frequently accompanied by a spouse or in the case of Marion, dependent children. Uninterested in completing high school, Marian sought employment as a stenographer. She married for the first time in 1915 to a man who abandoned her soon after. Rachel was "eight when Marian married...and twelve when Marian's divorce was final" and Lear claims that the Homestead they shared was so small "there could have been few secrets and little privacy for anyone. After [her husband] deserted Marian, Rachel observed her sister's unhappiness and her mother's embarrassment" (WFN 23). There were lessons lost on lovely Marian who married unsuccessfully for the second time a year later. This marriage, similarly short and disastrous, produced two children (Virginia and Marjorie Williams) that she could not support alone and her husband was either unable or unwilling to contribute to their care. While Marian depended on her younger sister for a lot of support, I am uncertain of whether or not they were emotionally close. Certainly, Carson had painful and frequent access to Marian's misfortunes and misadventures, but the extent to which those experiences manifested in ways other than Carson's providing physical and financial support, is unclear to me. Additional biographical information about Carson's brother Robert appears in a later footnote.

5 This is significant to point out because as shall be shown in chapter five ("Science, Sisters, and the Sea: Rachel Carson and her Refusal to be Silent on Matters of Science in the Sea Books"), many women involved in the sciences in the last three centuries have found their experiences mediated, limited, and even erased by men, often their fathers, brothers, and husbands. Carson was fortunate to be spared at least this obstacle (although she would not be so lucky as to escape all of the factors limiting women's

access to science). Lear describes Carson's father as an elusive figure, a "kindly quiet man with a reserved but dignified manner" and friends who visited the Carsons remarked on his "poor health and quiet demeanor" (WFN 12, 501n31). Robert Warden Carson died at the age of 71, cradled in his wife's arms, having "spent most of his life struggling ineffectually to find a place for himself" and "Rachel, who rarely spoke of her father when he was alive, mentioned him publicly only once some twenty-five years later during an interview for a Pittsburgh newspaper, dignifying him with business associates he never had" (Lear, WFN 77). The Carson's "had always struggled, [so] his death did not alter their real social status" (Lear, WFN 76). At 38, Marian was already in poor health, suffering from a variety of illnesses all complicated by the consequences of poor choices and a hard life, but she had a part-time administrative job she worked as long as her health permitted. 36-year-old Robert was "the obvious one to step in to fill the [financial] void" left by his father's death, but he failed to do so (Lear, WFN 77).

6 It is interesting to note that Comstock's own introduction to nature study was inspired by a "gentle Quaker mother" who was at the heart of her family (Bonta 155). According to Marcia Myers Bonta in Women in the Field: America's Pioneering Women Naturalists, "as soon as Anna was old enough to understand, her mother taught her the names of sixty wildflowers and a dozen constellations" (155). A generation later, one dynamic mother-daughter relationship would lead to the enhancement of another, when Maria embraced Comstock's philosophy and curriculum. Despite the differences in their backgrounds, the same moral code and love of nature would be shared between Carson and Dorothy Freeman, since she "had grown up at the height of the nature-study movement" as well (Lear, WFN 246). As a final interesting parallel that suggests the cohesive continuity of women's history (even though much of it is still hidden), both Comstock and Carson attributed the success they achieved in their respective fields as well as their talent, to the subjects they portrayed. For Carson, this acknowledgement came when she was asked about her beautiful renditions of the sea in The Sea Around Us. She responded that if there was beauty in her book, it was because she had captured it with science and imitated it with words (Lear, WFN 219). Similarly, when Comstock earned the distinction of election into the American Society of Wood Engravers (she was only the third woman who had done so), she "modestly explained that she was not a true artist and had been honored only because her work of copying a live insect [that] was [the] original" (Bonta 159).

7 There were many reasons for Carson's poor attendance record during her public school years, among them her poor health, her mother's concern for her health, and the geographic isolation of their Homestead in Springdale, Pennsylvania—it must have been particularly brutal to ascend steep Colfax hill in mud or snow or during much of the frequently harsh climate of western Pennsylvania. Referring to her strained family life, Lear argues that the "source of Rachel's isolation was not only economic and geographic but psychological as well" (WFN 21).

8 Many critics have remarked on the spiritual and even mystical qualities of Carson's writing, and while I see such matters as justifiable concerns for feminist and ecofeminist inquiry, I am not the one to comment on them, In addition, Raglon's observation is typical of many scholar's attempts to position Carson's work within masculinist histories, an issue I will return to in chapter four, "Living on the Edge: Locating the Other in Rachel Carson's Three Studies of Shores and Seas."

9 Advancing the value of incomplete pictures and partial perspectives and recognizing the limits of human perception (particular human vision), are strategies that ecofeminist critics have identified as among those that have and can be successful challenging primarily Western ideologies of oppression. I will provide an ecofeminist reading of Carson's sea books in chapter four, and a review of her engagement with science and knowledge in chapter five, "Science, Sisters, and the Sea: Rachel Carson and her Refusal to be Silent on Matters of Science in the Sea Books."

10 In no way do I intend to underestimate the weight of attachments, even lovely ones, even cooperative and productive ones. And, with the kind of struggles Carson and her mother overcame together, the strain on their relationship must have been unbearable at times. For example, Lear recounts that "Maria's pride in Rachel's literary success, natural as it was, increased her anxiety about Rachel's health. It also heightened Maria's tendencies to screen Rachel's activities and manage her career" (WFN 209). The fame that Carson accrued following the publication of The Sea Around Us "tested her relationship with her mother, whose need to be a part of Rachel's life increased with her daughter's public recognition" (Lear, WFN 208). Even though "Rachel's' patience with her mother was sorely tried [it] never seems to have wavered" (Lear, WFN 209). Like most successful associations, the more common the bonds, the stronger the alliance. Carson and her mother were stronger, together because of the extent to which they shared the ethic and practice of caring. For Hilary Rose in her essay, "Beyond Masculinist Realities: A Feminist Epistemology for the Sciences," women have always participated in the sciences, although they were tracked to the practical sciences, rather than more highly regarded theoretical work. Replicating the gender divisions of labor in the home, women in science were the technicians and men were the scientists who did the "real" work of science. Nevertheless, Rose argues that women's experiences as caregivers in the home can be useful to draw

from in developing strategies that disrupt the pervasive masculinism in the culture and ideology of science. Invoking the incredible range of sensory and emotional responses to caring for others, Rose reminds us how susceptible we are to our senses and how connected we are to each other. She explains that, "[c]aring, despite the best efforts of social work and psychotherapy, requires much more than the abstraction of words. We could feel in our heads, our hands, and our feelings the satisfaction of caring for someone, making someone content, finding all the little pieces of comfort that were important to that small child, that very elderly person: a mixture of words and silences, of favorite foods and drink, of hard work in cleaning up a wet or dirty bed, of special ways of doing things. Often tiring, it was satisfying, knowing that you had worked it round, you had taken care of them. All senses were involved; the person looked good, felt good, sounded good, smelled sweet. Yet, the pleasure at best did not just belong to the caregiver; it belonged to the cared for as well" (Rose 72). In my mind and in my experience, people who share the common bond of caring for others and being cared for by them, share a powerful connection, indeed and I will continue with these issues in this chapter. While I will not be able to cover these issues completely in this project, I will examine Carson's critique of patriarchal and masculinist science in chapter five, "Science, Sisters, and the Sea: Rachel Carson and her Refusal to be Silent on Matters of Science in the Sea Books."

11 Biographers have frequently focused on Carson's choice for science as risky, however her earlier intention to make a living as a writer may have carried its own limitations because according to McCay, "women writers of the 1920s could expect to write for women's magazines on domestic matters: children, family, love, cooking—in short, home economics" (McCay 6).

12 Carson does not use the term "material immortality" in the sea books and I am not sure if it occurs in any of her published writing (she does however refer to it in a personal letter (referenced in a later footnote), and she mentions a similar process of "virtual immortality" in The Sea Around Us (71). Lear describes material immortality in Witness for Nature and McCay points out that Aldo Leopold's discussions of continuity and cycles in A Sand County Almanac are referred to as "collective immortality" (96-7). For McCay, Leopold was an "intuitive ecologist [who] saw the harmony in nature and framed it in much the same way that Carson did in her earliest article on the sea" (96), although Carson probably never read A Sand County Almanac (Lear, WFN 521n6).

13 McCay claims that Carson had "companionship when she wanted it and freedom and privacy when she needed it" (McCay 16), however Lear's account in Witness for Nature makes that difficult to believe. Lear reports of only a brief period of months when Carson's care giving duties waned and responsibilities relaxed. During the summer of 1940, Maria "managed the household so efficiently that Rachel could give herself over to her creative endeavor" but it would be one of the few and finally "the last time she would have such a luxury" (Lear, WFN 102).

14 Minimizing the number of Carson's dependents is typical of the way in which her financial and care giving responsibilities were minimized in general, and it is difficult to know if this trend is anchored in a kind of patriarchal erasure perpetrated by some biographers, or if it is evidence of the ongoing and successful conspiracy of silence surrounding the Carson family (initiated, cultivated, and perpetuated by them). Probably, it is a combination of the two, however, the result is sadly the same: public portraits of her life grossly underestimate the level of her attachment to others, thereby leaving unexamined how that involvement influenced, inhibited, and enriched her life and her work.

15 My purpose here is not to lambaste Carson's biographers or critics of Carson's work—she was by no means and easy subject. Instead, accessing these ideological blind spots is an acknowledgement necessary in order to open up insights into Carson's work. Even though McCay and Gartner's accounts lack specific details and therefore must rely on broad statements and generalities, their work is full of warmth and affection typical of the response Carson evoked in those around her. Lear's Witness for Nature, by contrast, is incredibly comprehensive although perhaps nuance is sacrificed periodically under the weight of heretofore unavailable information. For example, Lear recounts all events, large and small, from Carson's greatest triumphs to her greatest disappointments, from colds and flus that plague us all to illnesses she hid from her family and closest friends, from the death of beloved pets to a traffic violation and a dispute with a record company, Lear reports event after event, all the while resisting both speculation and analysis. Still, such reporting is neither neutral nor objective. In both cases—Gartner and McCay on the one hand and Lear on the other—ideological blind spots and heterosexist assumptions are perpetuated, despite the desire by the writers I suspect, to do just the opposite.

16 Presumably, Carson's domestic labor did not lessen until January 1963 when her doctor diagnosed her with angina and gave her strict orders to walk as little as possible and forbade her from climbing stairs and doing housework (Lear, WFN 441). By this time, Carson could afford to secure help with domestic tasks and care giving, but such burdens are not so easily shed.

17 While Carson would have preferred information about her brother and the details of their strained relationship to remain within the family, such knowledge deepens understanding of the challenges

Carson faced, as well as the commitment of her value system. Lear dutifully reports on the scurrilous behavior of Carson's older brother Robert, sometimes even downplaying it by burying them in footnotes. Even so, the cumulative effect is painfully convincing. Like his older sister Marian, Robert Carson "never went beyond the tenth grade" (Lear, WFN 23). Instead, he worked in a radio repair shop prior to joining the Army Air Service to fight in World War I. After his discharge, Robert returned to Springdale and the Homestead "quite cocky and full of himself" (Lear, WFN 23). He was "popular with the young women of Springdale and enjoyed an active social life" which was "not only carefree but reportedly somewhat dissolute" (Lear, WFN 23). Robert appears to have been a frequent thorn in his mother's and later his younger sister's side. According to Lear, he took advantage of his mother, ridiculed Rachel (while happily enjoying various fruits of her labor), disapproved of Marian, her children and later their children, neglected both his wives, abandoned his first and then failed to support their daughter. He was "self-righteous, arrogant, and cruelly critical of others. Like most bullies and cowards, he lived his own lie. He had never told his [second] wife Vera, a Canadian woman he had met during one of his fishing expeditions, that he had been married before and divorced, nor that he had a grown daughter whom he neither acknowledged nor supported" (Lear, WFN 213). While he had plenty of opportunity to help his younger sister, more often than not, he added additional burdens. Although she'd helped him on numerous occasions, Robert offered little in the way of support or understanding to Rachel when Marian died. Instead "Robert had been critical of Marian and her daughters and often of Rachel as well;" according to Lear, Robert "seems to have contributed his physical labor when his mother asked but offered nothing to relieve his younger sister of the financial or emotional burden" (Lear; WFN 84). After years of taking advantage of his sister's generosity and support, and despite the fact that his livelihood as an electrician was more stable than ever and he had at the very least "the means to support an active social life for himself," he apparently felt no obligation to Rachel and abdicated himself from responsibility for Marian's children (Lear, WFN 504n9). He was insensitive and superior (Lear, WFN 536n4); Carson and her mother were loathe to share Marjorie Christie's complicated pregnancy with him, because by that time he was a strict Baptist and would be "judgmental and unforgiving" (Lear, WFN 213). Despite grating inequities between them and interaction bordering uncomfortably close to abuse, Carson continued to socialize with her brother—perhaps at her mother's insistence, perhaps simply because that's what families do. Nevertheless, Robert and his wife visited Carson in Maine (Lear, WFN 263) and enjoyed Carson's celebrity by attending various book parties and award ceremonies as part of the family. They lived nearby each other for much of their adult lives in Maryland (Lear, WFN 526n17) and before she capitulated and bought a television, Carson watched "Something About the Sky," the Omnibus episode she'd written "at her brother's house with Roger and the rest of her family gathered 'round" (Lear, WFN 282). Towards the end of Carson's life, Robert, "to whom Rachel had given power of attorney" offered an isolated concession of concern by insisting someone stay with her at all times (Lear, WFN 478). He returned to his former self shortly thereafter when Carson died, and he was utterly rotten to Roger, Marie, and all those much closer to his sister than he. He had never liked Roger, had even been openly hostile to him at times (Lear, WFN 301), but Roger's "memories of that time are nightmarish" (Lear, WFN 481). Within hours of his Rachel's death, Robert "stormed into [Roger's] bedroom to confiscate the television set, the one thing that brought the boy a certain comfort, claiming that since Rachel had left her personal effects to him, the television was not his" (Lear, WFN 481). He defied his sister's wishes to be cremated and ignored the arrangements she'd made for an intimate service (Lear, WFN 480). While he insisted "Carson's body be buried alongside that of her mother," he yielded to pressure from Carson's friends and loved ones to abide—at least in part—by her wish to have her ashes scattered on the coastline of Maine (Lear, WFN 482). Still, an unapologetic and incalculably cold Robert sent the other half of his sister's ashes through the mail to Dorothy Freeman who, one morning in late spring of 1964 discovered "a shoe-box-size package wrapped in brown paper dangling precariously by its strings on the flag of her mailbox... without note or explanation" (Lear, WFN 483).

[18] Rachel was always close to her niece, Marjorie Williams Christie. Christie was born in late 1929, the second child born to Carson's older sister Marian (Lear, WFN 31). Carson lived with the two girls for much of their young lives and raised them following the death of their mother from pneumonia in early 1937; Virginia was twelve and Marjorie, eleven (Lear, WFN 84). They both left Carson's home after graduating from high school, and both returned shortly thereafter, repeating a by now familiar family pattern. During her adult life as in childhood, Christie spent a lot of time with her aunt and grandmother. Christie joined her aunt, grandmother, Shirley Briggs and other friends for weekend excursions, bird walks and frequent pleasant evenings together (Lear, WFN 140). She was an engaging and agreeable companion and regularly accompanied Carson when she traveled. Christie went to Island Beach, New Jersey with Carson and Briggs on their government mission (Lear, WFN 179) and she and baby Roger went to Myrtle Beach with her aunt, grandmother and sister for a research vacation (Lear; WFN 249). She spent long, lovely weeks with Carson during summers in Maine; during one visit, she helped

Carson "plant wildflowers and perennials around the rear of the cottage and put in new shrubs" (Lear, WFN 271). Carson considered her niece a kindred spirit (Lear; WFN 303), enjoyed her company, and "together they explored the shoreline and woods" (Lear, WFN 245). She was understandably crushed with concern when in the fall of 1951, she and Maria returned "from Maine to Silver Springs to learn that Marjorie... had been having a relationship with a married man and was several months' pregnant" (Lear, WFN 213). Christie was diabetic and a candidate for a high risk pregnancy. Anxious about her health and emotional well-being, Carson and her mother concocted "a plausible version of the truth" to mollify cruelly critical Robert Carson, and she enlisted a family friend to find "a physician to care for [Marjorie] and made arrangements to protect her privacy until the baby was born" (Lear, WFN 213). Later, she would go to incredible lengths "to see that the privacy of her niece... would be protected during her medically risky pregnancy" and planned several research trips "that kept her and her mother out of town from March until late September 1952" in order to "deflect public attention away from her immediate family" (Lear, WFN 236). As she had her mother, Carson supported Christie financially for much of her life as part of tending her emotional and physical needs. She paid expenses for her while she was in college (Lear, WFN 518n32) and after Roger was born, she paid the rent on Christie's house, helped her with medical bills (Lear, WFN 539n50), and planned for the time she would no longer be able to look after herself and her child by looking for a home that would hold all of them (Lear, WFN 288). She also imagined expanding "the Maine property either by building a separate little house to accommodate [Marjorie] and Roger or by enlarging the cottage" (Lear, WFN 290). In what Lear calls "a loving gesture to Roger," and one that provided "enormous pleasure for a young mother whose life lacked for so much," Carson assigned the rights to her article "Help your Child to Wonder" over to the Christies, both as "a token of her affection as well as a way of helping them out a little financially" (Lear, WFN 284-5). She would do the same for another article known as "Jr. Sea" (Lear, WFN 294) and then plan "to use the revenues from the junior edition of The Edge of the Sea to take care of [Marjorie] and Roger's living expenses, their medical care, and even the boy's education" (Lear, WFN 297). In 1957, Marjorie Christie died suddenly at the age of 31 from a staph infection following a desperate struggle with pneumonia and pernicious anemia (Lear WFN 300, 382). According to Lear, "Rachel had been totally unprepared for [Marjorie]'s death—at least not then, not when she had been improving—and she was devastated by its suddenness and by the loss of her sweet-spirited and companionable niece (Lear, WFN 301). She had been "alone with [Marjorie] during the last desperate hours before they could get her to the hospital, and the experience seared her heart" (Lear, WFN 300).

19 It is interesting to note that Carson herself turned to the sea books in times of crisis, claiming to Dorothy Freeman that "the elemental nature of the subject matter, its timelessness, beside which human problems and even human tragedies fall into perspective" (Wilson 52). According to Lear and prompted by her failing health, Carson had been moved to consider matters of death, explaining to Freeman that "as a biologist, she believed in the kind of 'material immortality'" that she wrote about, but she was comforted imagining that she would live on in the minds of her readers, "largely through association with things that are beautiful and lovely" (WFN 444).

20 Lear lists a number of specific events that Carson missed because of her care giving responsibilities such as when her friend Edwin Way Teale accepted the Burroughs Award on her behalf and read her speech in April 1952 (WFN 225). Perhaps even more difficult were the ways in which her life was increasingly curtailed on a daily basis with providing care to others. For example, during the summer of 1956, Carson was constrained "from doing any sustained work by her mother's care" (Lear, WFN 293) and the following summer, "she ended up taking care of both [Maria] and Roger [Christie] by herself" (Lear, WFN 304). Such moments were complicated by "the feeling that no one could quite understand why she could not just sit down and write" and in a tearful letter to Freeman, she confessed "I would open my eyes remembering everyone waiting and not understanding, and I'd only want to go to the bathroom and be sick!" (Lear, WFN 309).

21 I argue that much of Carson's life was driven and shaped by care giving responsibilities and the most obvious time this was evident followed the death of her mother, when parenting Roger Christie on her own overwhelmed her, she actively pursued relationships with other parents (or at least others who were familiar with children and parenting concerns) at the expense of relationships that met other needs. In Witness for Nature, Lear claims that like "any parent, Carson's friendships after 1957 were increasingly limited to those who took an interest in Roger" (350) and traces a number of relationships that waned while Carson was preoccupied with parenting, as well as those that flourished.

22 As an interesting parallel, Birke points out that at least some first wave feminists promoted homosexuality as an essential component of identity. Most notably, "Radclyffe Hall followed Havelock Ellis in her belief that homosexuality was inborn, an essential quality of individuals half-way between men and women; to Hall, to encourage this belief was to encourage greater social tolerance of a beleaguered minority" (Birke 253).

[23] Raglon raises this issue of essentialism, but dismisses it immediately when she claims that "[s]ome feminist writers are dismayed with any suggestion that women might have a 'special' connection with nature. Carson's type of writing, however, ensures that much of this intellectual distress is moot. Women, men, and children have all discovered in the late twentieth century that their bodies are not only connected to nature, but an inescapable part of it. Thus, when nature is perceived as scarred and abused, the implications for humans become frightening" (Raglon 207). For me, critics of Carson's work have missed inflections of sex and gender because, as mentioned in chapter one, scholarship on the sea books has been largely informed and limited by analysis of Silent Spring. Material immortality, bodily rhythms, and migratory patterns are among the many eternal cycles that are ultimately disrupted or broken in Silent Spring. For McCay, Norwood and Raglon, these cycles were important foundations that made the broken ecosystems and biological cycles in Silent Spring all the more powerful. Sometimes, critics yield to a new agey perspective rather than open themselves to charges of essentialism. Even though I believe spirituality has a "legitimate" place within feminist inquiry by offering possibilities for both disruption and healing, it is not as successful when left unexamined.

[24] I will return to issues of Carson's feminism more directly in the chapters ahead. For now, I will simply note that Carson's life was neatly contained between the first two waves of visible feminism of the last 150 years. While she did not claim the name, she did advance many of the ideas and critiques that are identified with both first and second wave feminisms. Interestingly, Carson did not publicly identify herself as an ecologist until near the end of her life.

[25] I agree with Fuss's imperative that feminists must "continue to investigate the place of essence on contemporary critical discourse," and agree as well that a shift in emphasis might be necessary and that "perhaps we should be interrogating not only the place of essentialism, but the essentialism of place; one question might provide us with a gloss on the other..." because what "is *essential* to social construction is precisely this notion of 'where I stand,' of what has come to be called, appropriately enough, 'subject position'" (Fuss: "Reading Like a Feminist" 104) (author emphasis). Suggesting a similar switch of perspective, Grosz, explains that by "assuming that feminists take on essentialist or universalist assumptions (if they do, which is not always clear) in the same way as patriarchs, instead of attempting to understand the ways in which essentialism and its cognates can function as strategic terms, this silences and neutralizes the most powerful of feminist theoretical weapons—feminism's ability to use patriarchy and phallocratism against themselves, its ability to take up positions ostensibly opposed to feminism and to use them for feminist goals." (Grosz 95).

[26] Biological essentializing is one of four categories of essentialism as described by Grosz. For Grosz essentialism is a term rarely actually defined in context and refers "to the existence of fixed characteristics, given attributes, and ahistorical functions that limit the possibilities of change and thus of social reorganization" which may include psychological (nurturance, empathy, non-competitiveness, etc.) and "observable social practices, intuitiveness, emotional responses, concern and commitment to helping others, etc.)" in addition to those more closely identified with women's biology (Grosz 84). Biologism, a particular kind of essentialism "usually ties women closely to the functions of reproduction and nurturance, although it may also limit women's social possibilities through the use of evidence from neurology, neurophysiology, and endocrinology" (Grosz 84). Like biologism, naturalism postulates a fixed nature for women, an "unalterable bedrock of identity...and a permanent form of social containment" (Grosz 85). Universalism is related to the terms above, but "may be conceived in purely social terms" and "need not be based on innate or fixed characteristics" (Grosz 85).

[27] See Londa Schiebinger's "The Private Lives of Plants" in Nature's Body: Gender in the Making of Modern Science for an intriguing discussion of the sexualization of plants during the eighteenth century, including the evolution of spermatophytes.

[28] It should not escape attention that the images discussed in this section are like those in the last, limited to one chapter, in one book ("The Rocky Shores" in The Edge of the Sea), perhaps signaling Carson's lack of interest in essentially biologically and heterosexually determined behaviors. In any case, inclusion of these issues conveys a political savvy toward gender construction that has been left largely unexamined by scholars.

[29] Challenging conventional heterosexual gender relations by excluding them from consideration is one of the more radical strategies Carson employed in the sea books. In Lesbian Texts and Contexts: Radical Revisions, Joanne Glasgow and Karla Jay suggest that such a subversive strategy may allow scholars to better describe what constitutes reading or writing as a lesbian. Obviously, this is juicy stuff and merits additional attention; therefore, I will return to a consideration of Carson as a lesbian, scientist, and writer in chapters three and four.

[30] There are those who consider Maria's influence on her daughter questionable, her interest excessive. For example, some biographers have suggested that Maria's frequent visits to campus when Carson was in college may have inhibited her social life (Lear, WFN 30) and others have blamed Maria for her

daughter's "failure to marry" (McCay 16). Frequently ignored or downplayed are the ways in which it was an arrangement that worked for both of them.

[31] Both draw from stereotypes of domineering mothers in their descriptions of Maria and both assume and consistently insist that Carson was heterosexual in her orientation (albeit inactive).

CHAPTER III.

PARTING FRONDS AND PROBING FINGERS:

RACHEL CARSON TAKES HER LOVE TO THE SEA

Rachel Carson did not identify herself as feminist and many critics have therefore mistakenly assumed that there is nothing particularly feminist about her work. Ellen Leopold marks the advent of second wave feminism with Betty Friedan's The Feminine Mystique, and notes that Carson could not have been feminist because she fell ill and died just prior to its publication (114). However, Carson was witness, participant, and critic of the culture that would make the emergence of second wave feminism inevitable. In addition, Carson was a direct beneficiary of first wave feminists and women scientists and naturalists who drew upon domesticity and the joys of motherhood in order to justify their joining in public discourse. For Maria Carson and her nineteenth century peers who studied science,

> By remaining within the accepted bounds of femininity, women could exploit their domestic autonomy by actively feminizing areas of public culture that could be construed as extensions of the domestic sphere [. . .]. (Benjamin 15)

It is reasonable then, that American women scientists and naturalists of the Victorian era chose the home as their primary metaphor for describing plant and animal life (Norwood 148). According to Vera Norwood in Made from this Earth: American Women and Nature, Carson and women in her circles talked about "responsibility to protect the home," and imagined that responsibility extending "to their community, their country, and, in their most expansive moments, the whole earth," just like their mothers and grandmothers had before them (170). In an article published in 1938, Carson asserted

directly that "the home of wildlife is also our home" (Lear, WFN 92) and her tribute to the home is readily discernable in her personal life, in her science, and in the sea books.

As mentioned in chapter two, "Mother, Sea, and Material Immortality," Carson regularly returned the specimens she collected to their homes after she completed her observations. Field notes from an excursion to Virginia beach reflect a similarly high regard for the place of homes in the natural world. After picking up and examining a small ghost crab, Carson became concerned that it would not find its way home. So, she used her fingers to make a new hole in the sand, and after the crab darted into it, she reported that they were both happy (Lear, WFN 186). Carson promoted individual homes as immensely important to creatures, but recognized them as imperative for the assurance of social continuity as well. For Carson, homes are frequently caught up in the same cycles by which resources are kept in constant circulation in the environment. For example, she notes that holes left empty by boring piddocks may attract other lodgers, as "abandoned birds' nests may become homes for insects" (TETS 187). In a wonderfully layered example, ospreys recycle bits of flotsam, jetsam, and various pieces of human debris into their homes:

> In the course of years the ospreys had woven or worked into the nest a twenty-foot piece of haul seine with ropes attached [. . .], perhaps a dozen cork floats from fishing gear, many cockle and oyster shells, part of the skeleton of an eagle, parchmentlike strings of the egg cases of conchs, a broken oar, part of a fisherman's boot, tangled mats of seaweed. (UTSW 86)

Her description is incredibly detailed and precise, and does not stop with a catalog of the found materials that constitute of the nest. She reports that the same osprey pair has shared the nest for successive seasons, year after year, and that the lower levels of the enormous mass provide seasonal quarters for many small birds including families of

three sparrows, four starling, one Carolina Wren, an owl, and once even a green heron (UTSW 86, 87). This is one large home that holds and sustains diverse, integrated communities.

Carson observes and tracks the endless reapportionment of homes with great regularity. In one habitat, muddy debris comprised of shells and other particulates settles under long-term mussel beds and creates "still another area for life, a sort of understory inhabited by a variety of animals including worms, crustaceans, echinoderms, and numerous mollusks, as well as the baby mussels of an oncoming generation" (TETS 101). Even the shells of snails are reused in the incredible economy of the sea. Carson explains that while the "living snails are held by some intangible bonds" to their specific tide level, the shells discarded when they die "are found and taken as habitations by the smallest of the hermit crabs, who then carry them down onto the lower levels of the shore" (TETS 208). The recirculation of homes is simply another revolution of Carson's "cycle of life," the process by which "the intricate dependence of one species upon another" is achieved (TETS 151), as well as the process by which social systems are perpetuated. With a wealth of scientific evidence to back her, Carson explains:

> [I]t is now clear that in the sea nothing lives to itself. The very water is altered, in its chemical nature and in its capacity for influencing life processes, by the fact that certain forms have lived within it and have passed on to it new substances capable of inducing far-reaching effects. So the present is linked with past and future, and each living thing with all that surrounds it. (TETS 37)[1]

That home life is reflected in Carson's work is hardly surprising. In addition to the legacies left by first wave feminists, "the concept of 'home' had a much deeper meaning" for her because of the close relationship between mother and daughter (Norwood 171). For Carson, home is not simply a physical structure or discrete dwelling (a house), it is a

dynamic and communal space that permits a broad array of social activities, interaction, nurturing and finally continuity.[2]

The importance of social attachment and connections between home and community are themes repeated frequently throughout Under the Sea-Wind, The Sea Around Us, and The Edge of the Sea. For example, it is a memorable event when the mackerel Scomber becomes "a rightful member of the drifting community" of plankton (UTSW 127), and Carson notes that in the "underground city of sand" on beaches, few of "those who build permanent homes [. . .] live by themselves" (TETS 142). She assures readers that a single scampering rat really lives "with his mate and others of his kind" (UTSW 13) and that fish lying in torpor during the coldest months of winter do so together in tribes (UTSW 110). She identifies beings formerly of solitary habit that have evolved into communal beings as when she reports on species found along intertidal coral coasts that "have become colonial," their tubes forming intimately intertwined masses (TETS 212). Thus, successfully integrated communities provide all the safety and comfort of homes even in the absence of discrete dwellings. By incorporating descriptions of homes as communal spaces that are cooperative and collaborative, I explore the ways in which Carson promotes the perspective of a woman-identified-woman in portrayals of the natural world in the pages ahead. Furthermore, I argue that these values are communicated with an additional emphasis on collectivism that suggest a lesbian outlook and ultimately contributes to the establishment of a lesbian narrative space in the sea books.[3]

As mentioned at the outset of this chapter, Carson did not identify herself as feminist. Similarly, she did not identify herself as lesbian, and neither biographers nor critics have imagined that there might be lesbian perspectives portrayed in her writing. However, if Leopold is correct that Carson could not claim a feminist identity because she lived prior to the emergence of second wave feminism, then it could also be argued

that Carson could not claim a lesbian identity because she died prior to the 1969 riot at the Stonewall Bar in New York that for many marks the beginning of a modern, organized movement for homosexual rights.[4] Both of these parallels (Leopold's and mine) are somewhat misplaced, however. Instead, the sexist, heterosexist and homophobic attitudes and policies that made claiming either identity unappealing and even dangerous to Carson, continue to prevail in Western, patriarchal culture and make it difficult for scholars to consider matters of identity and conditions of existence (such as feminism and lesbianism) without the explicit acknowledgement of the subject. In the introduction of their critical anthology, Lesbian Texts and Contexts: Radical Revisions, Karla Jay and Joanne Glasgow acknowledge that,

> Even in 1990 [. . .] thoughtful and concerned feminists do not, perhaps cannot, agree about just who is a lesbian. Is she a woman whose erotic desires are for other women, or is she a "woman-identified-woman"? Is she a woman at all, if woman is a heterosexist language construct? (4)

These questions and issues remain relevant though relatively unexamined some twenty years after Adrienne Rich considered the concept of woman-identified-women and spoke of a "feminist critique of compulsory heterosexual orientation" as being long overdue (Rich 27). Therefore, this chapter must include a close examination of the role of relationships, community, and the function of interdependence both in Carson's life as well as in the sea books. This will include making a case for Carson as lesbian, an acknowledgement that is made difficult not only because biographers and critics have perpetuated heterocentric assumptions about her in their work, but because Carson was notoriously private about the details of her life and significant attachments and went to great lengths to conceal them.

For Rich and others, woman-identified-women can be included in the study of lesbians in history because like lesbians, they break with patriarchy by denying

identification with men, by choosing to join with women in powerful alliances and life partnerships, and by selecting women as co-workers and companions (Rich 27). Lesbians are woman-identified-women, but they challenge patriarchy more directly by uniformly and consistently (if not always openly) resisting the pull of compulsory heterosexuality as a way of life (Rich 52). Even though some scholars have traced the outlines of this matrix by acknowledging the importance of Carson's work with women in conservation and environmental movements, and recent biographers and scholars have filled in details that attend to Carson's association with women, there has been a general reluctance or unwillingness to portray her life as woman-identified, let alone lesbian. As Carolyn Gage observed in her review of Linda Lear's Witness For Nature, "a homophobic academy [still] prefers the 'innocent-until-proven-guilty' approach, in which the biographer must make her case for queerness beyond a reasonable doubt" (10).[5] Therefore, as in the previous chapter, I will piece together a perspective on Carson's life using biographical details provided by biographers and critics, but I will not rely on their evaluation of those details. This time, I will include a consideration of the obstacles faced by Carson's biographers and confront some of the critical distortions that have resulted from the misconceptions they've perpetuated.

In her study on biographies of women, Hamlet's Mother and Other Women, Carolyn Heilbrun argues that "we all make fictions of our lives," although for women, that fiction is already inscribed by society because "they are to be married, to be circulated, to mediate between the man and his desire for a son" (189). Biographers and scholars have uniformly resisted identifying Carson as lesbian, instead struggling to imagine a life (not) defined by attachment and relation to men and resulting in uneven and conflicting characterizations. One biographer described Carson as "shy and reserved, apparently avoiding intimate relationships, although she always showed concern for others" (Gartner 8). Another biographer claimed Carson was "a seemingly conventional, middle-

aged woman" (McCay 1), who was by all accounts "an intensely private person, reserved rather than shy" (Lear, "Rachel Carson's SS 24). Marcia Myers Bonta assures her readers that a young Carson was like other college girls, "she went to proms and had a boyfriend whom she dated throughout her college career" (263), although Carol Gartner asserts that there is "little evidence of male friends during Carson's college years," and that letters written while she was in graduate school refer to men only as competitors in laboratory work (8). Paul Brooks, who was Carson's editor and long-time friend, clearly communicated his admiration for her work in his biography, but was similarly transparent in viewing "her unmarried status with a certain pity" (Raglon 198). Brooks and other biographers have spent much time locating Carson within Western patriarchal social order by rationalizing her decision not to marry and ignoring or significantly devaluing her relationships with women.

The lives of women who circumvent patriarchally inscribed gender requirements by resisting marriage, by organizing their lives independent of men, and by maintaining significant intimate, loving, and productive relationships with women are rarely recorded or are reported erroneously. Such trends are particularly evident in early biographical accounts of Carson, but they have continued to circulate in later biographies with a resiliency that defies explanation. For H. Patricia Hynes, biographers obsessed "with Carson's being unmarried [have painted] her personality with a limited palette [in order to] portray a life without a man rather than a life with women" (RSS 61). Rebecca Raglon notes that more recent reassessments

> have tended to look at [Carson's] life as a full, rich one, and have shown that her career flourished within a culture of women mentors, beginning with her mother and going on to women who befriended her in college, and later in the literary world. (198)

For scholars like Hynes and Raglon, Carson's life might exemplify the life of a woman-identified-woman, yet there remains much resistance to recognizing her as lesbian overall. Even Lear's biography, which is, according to the *New York Times*, "the most exhaustive account so far of Carson's private, professional, and public lives" (Gage 10) is for one scholar, "comprehensive without being complete" (Wilson 47). Thus like most lesbians in history, consideration of Carson's life requires reading between some very straight lines.

In Witness for Nature, Lear claims her purpose is to clear up Carson's record and put her "early inquiries in proper sequence and context," particularly in regard to Silent Spring (546n10).[6] Yet, Emily Herring Wilson is uncomfortable with Lear's "frequent references to what Carson wore for important public occasions" and her descriptions of overtly stereotypical feminine traits and habits (47), and Gage remonstrates that the word "lesbian" does not appear anywhere in Witness for Nature, not even in the index (10). Nevertheless, Gage acknowledges the importance of Lear's work and explains that,

> To [her] credit, [Lear] does not withhold details of Carson's relationships with women, even when these details indicate lesbian attachments. In fact, she has done a considerable amount of detective work in uncovering them. What she fails to do is establish a context for understanding the significance of these lesbian relationships and how Carson's orientation as a lesbian shaped her career and her ideas. (10)

Witness for Nature has been an invaluable resource for me throughout this project. It would be unfair not to recognize that the details Lear provides, the language she uses in her descriptions of Carson's relationships, and even some support in narrative structure, have contributed significantly to my understanding of Carson's life as a lesbian. Still, Wilson, Gage and others are correct to admonish Lear for this hardly arbitrary oversight

of a significant component of Carson's life, particularly since many of these relationships inspired and contributed to her writing.

Following her relationship with her mother, the first cooperative, collaborative, and loving partnership for Carson was with Mary Scott Skinker. They met in 1926 when Carson was an undergraduate student at Pennsylvania College for Women (PCW, now Chatham College), in Pittsburgh. Skinker became Carson's mentor and friend, inspiring Carson with her intelligence and energy, as well as fostering her love of science.[7] According to Lear, Skinker's "oversight of Rachel's career fitted a well-regarded strategy among female scientists that had been going on since the late nineteenth century" (WFN 45).[8] But Skinker was more than a role model for Carson, and what would evolve into a deep and abiding love began as a rather charming crush. Shortly after changing her major from English to science, Carson's attachment "to the impassioned and brilliant Skinker [became] as transparent as her fascination with the subject matter" (Lear, WFN 37). A field trip to an area frequented by Carson and her mother became "*unforgettable*" with Skinker—Carson added the emphasis to unforgettable in a letter to a friend (Lear, WFN 45). In another letter describing her junior prom, Carson wrote "more about what Miss Skinker wore [. . .] and how she looked than [she] did about her date" (Lear, WFN 44).[9] When Skinker left PCW in order to pursue doctoral work at Johns Hopkins University, Carson wanted to follow, but couldn't raise the tuition. Instead, she stayed behind and founded a science club on campus called Mu Sigma Sigma, which stood for Skinker's initials in Greek (Gage 10). Carson admired Skinker's intelligence and respected her character, but she was also drawn to her warmth and beauty.

Carson and Skinker stayed in close contact after Skinker left Pittsburgh and by the time Carson graduated from PCW, they were mutually affectionate friends. Skinker invited Carson to her family's cabin in remote Skyland, Virginia, on the eastern edge of

the Shenandoah Valley where they enjoyed the outdoors, riding horses, and hiking together. According to Lear,

> Most of all, Rachel enjoyed sitting with Skinker in front of an open fire in the evenings, talking to the woman who not long before had seemed a distant idol but now had become the most important person in her intellectual and emotional life. There were no longer any boundaries between mentor and protégéé. Both women were committed to the deepest well-being of the other. (WFN 56-7)

They would remain absolutely committed to each other through personal trials and the frustrations they suffered as professional women. They shared intimate details of family life with each other, and Carson learned to rely on Skinker's council and support as she pursued a career in science.

As unmarried, professional women in the sciences, Carson and Skinker encountered many of the same obstacles and were drawn together even more closely by shared suffering (Lear, WFN 495n27). According to Lear, Skinker molded Carson's "ecological consciousness, nurtured her talent, supported her ambitions, set fire to her mind, and loved her unconditionally" and Carson loved her "more deeply than anyone ever guessed" (WFN 150). Theirs was a powerful, sustaining, and passionate partnership, although it would not last. In 1948, Skinker's faltering health failed completely and she was hospitalized, dying from cancer. She had given Carson's name as her emergency contact and it was Carson who stayed with Skinker until she lost final consciousness (Gage 10). Although Carson was devastated by grief after losing her lover, Skinker was the first of many meaningful and lasting relationships she would enjoy with women. Later, she would become involved in loving relationships with Marie Rodell, Dorothy Freeman, Ada Gowan, Beverly Knecht, Lois Crisler, Shirley Briggs, and others.[10]

In addition to reciprocal love and shared interests, many of Carson's relationships with women involved working together cooperatively or collaboratively. The alliance between Carson and Marie Rodell is described by Lear as "a remarkable partnership" (WFN 149), an "equally exceptional friendship" (WFN 155), and an alliance that "profoundly shaped the lives of both women" (WFN 154). Rodell was energetic, ambitious, and outgoing, as well as a "valued friend" (McCay 17). She was a regular visitor in Carson's homes in Maryland and Maine and they frequently traveled together. Early in their relationship, Rodell chaperoned Carson during a memorable voyage on the *Albatross III* so that she could collect background information for Under the Sea-Wind (Lear, WFN 166). Much later, when Carson was confined to a wheelchair near the end of her life, she remained determined to complete a vigorous speaking schedule. Rodell not only made it possible for Carson to continue her tour by accompanying her, but made it tolerable as well (McCay 18). Their relationship ebbed and flowed, but it endured, and after Carson's death, Rodell did her best to fulfill Carson's wishes and continue her work.

For much of her life, Carson was overwhelmed with family obligations and a busy schedule, endlessly juggling full time work outside the home and ambitions to be a writer of note. Still, she made time to develop and maintain a number of significant relationships with women. Although their association was "carried on almost exclusively by letter" and despite superficial but "great differences in age, education, and experience," Carson considered Ada Govan a soul mate and shared with her an intimate connection (Lear, WFN 128). They began their correspondence in 1945 as colleagues, when Carson contacted Govan who was an expert on bird banding (Lear, WFN 127). Govan impressed Carson with her personal courage as well as with a love of birds that matched her own. According to Lear, their friendship became "the most intense emotional connection" for Carson after Skinker's death and correspondence between

Carson and Govan reveals her "longing for a relationship with someone who shared not only her love of nature but the struggle to make her way as a writer" (WFN 128). Much later, Carson developed similar relationships with two other women, Beverly Knecht and Lois Crisler, who likewise shared both a love of nature and a passion for writing.

Carson's relationship with Knecht was intimate and involved, but conducted primarily through lingering letters and lengthy conversations on the telephone. Carson was charmed by Knecht's ability to produce delightful prose and moved by compassion for her physical infirmities.[11] According to Lear, Carson pursued a relationship with a much younger Knecht, "not only because [she saw] a literary talent that merited mentoring, but also because she perceived a spiritual bond between them" (WFN 352). Carson's relationship with Crisler, on the other hand, was collaborative and intimate, but not passionate, although Carson and Crisler wrote each other "with a regularity Rachel reserved for few others" (Lear, WFN 351). Carson had been deeply moved by Crisler's book, Arctic Wild and found in Crisler a "female writer of commensurate talent with whom she could share her own struggles and intuitively acknowledge a similar point of view" like that she had shared with Skinker and Govan (Lear, WFN 329). Lear is the first and only one to chronicle Carson's relationships with Knecht and Crisler and she claims that both "were women whom Rachel could genuinely mentor and they allowed her to repeat in some ways the role Mary Scott Skinker and Grace Croff had played in her own life years earlier" (WFN 351). Carson ministered to "their emotional and spiritual needs at the same time that she encouraged them in their writing" (Lear, WFN 351); she was rewarded with great happiness (Lear, WFN 363) and the satisfaction of being part of a cycle coming to a whole (first as protégé, then as mentor).

Many of the characteristics Carson valued in her relationships with women are central in the sea books as well. For Raglon in "Rachel Carson and Her Legacy," while much nature writing has been organized "around descriptions of what appear to be

unattached, isolated phenomena" (200), Carson departed from such traditions by dwelling on relationships between beings where "each life is filled with incident" and each life impacts "innumerable other lives" (Raglon 201-2). Even when Carson describes movement that might imply separation, that separation is always temporary and contained within larger cycles of connection and attachment. Isolation is a fleeting anxiety confined to times of transition. For example, Carson explains that the life cycle of mussels includes a period when they are cast adrift in the sea prior to grounding themselves in colonies. While observing a thriving bed of mussels, she states:

> The presence of each individual mussel in this crowded assemblage is evidence of the achievement of its unconscious, juvenile purpose, an expression of the will-to-live embodied in a minute transparent larva once set adrift in the sea to find its own solid bit of earth for attachment, or to die. (TETS 90)

The mussels are separated as a natural part of their life cycle, yet reconnection to a community is equally natural and vital. Similarly, some of the myriad larvae of barnacles, mussels and saclike sea squirts awash in the sea are "as transparent as glass and more fragile," and all are "doomed to die in infancy unless they [find] a solid place of attachment" (UTSW 97). As in the specific case of the mussels, the best places to grab on are frequently heavily populated, suggesting such life cycles are not only successful, but popular.

In the cases above, attachment occurs between beings and their elemental surroundings. In other cases, attachment takes place between living beings where one serves as an anchor for multiple communities of others. For example, on mangrove coasts, "all the associated plants and animals are bound" to the mangrove by biological ties (TETS 243), and on coral coasts, complex associations are completely dependent on the coral polyp, "a minute creature of deceptively simple appearance" (TETS 199-

200). Along rocky coasts, horse mussels form the foundation "of a whole community of animals that would find life on [. . .] wave-swept rocks impossible except for the presence and activities of the mollusks" (TETS 100-01). And, in a particularly voluptuous scene, Carson describes a deep tide pool basin filled with clear, cold water and dusky swaying plants, and claims that an observer may slide her fingers down a stalk of laminaria and, gripping just above the holdfast, "pull up the plant and find a whole microcosm held within its grasp" (TETS 64). Examples such as these demonstrate that connection and community are constant companions in the natural world.

Carson wrote during a time when rugged individualism reigned supreme, when men dominated the public sphere "where intellect and rationality constructed society," and when women remained confined to a home that was increasingly "a place of retreat from activity, a static zone in a landscape of endless change" (Norwood 144). Carson reactivated that space by breaking the boundaries between public and private spheres and focusing on the dynamic interaction between and among beings and their homes in communities, both in her life and in her writing. In addition, she offered powerful alternatives to the dominant masculinist ideologies that sustain the split between those spheres. For Susan Lanser, private, domestic spaces can bee seen historically as discrete, isolated universes where "waiting, inaction, reception, predominance, and action [are] only minimally possible" ("Feminist Narratology" 687). Therefore, constructing narratives contemplative of those spaces may offer a source of possibility because "[c]ommunication, understanding, being understood, becomes not only the objective of the narration but the act that can transform (some aspect of) the narrated world" (Lanser, "Feminist Narratology" 687). In her descriptions of the natural world, Carson portrays interactions and interdependencies that disrupt patriarchy within homes as well as without, within narratives as well as without.

Carson challenged patriarchy when she presented animals flourishing in communities that are highly organized, but not hierarchical. Processions of a dozen or more individual Ochinidiums (a shell-less mollusk and snail, or a slug) issue forth from a common cave to feed on rocks along the coast. While their initial journey seems haphazard and irregular, their return at the end of the day demonstrates a remarkable degree of synchronicity. She explains that,

> before so much as a drop of water has splashed into their nests, all of the slugs cease their grazing and begin to return to the home nest [. . .]. The members of each community return to their own nest, even though the way may lie over greatly eroded rock surfaces and even though the path may cross the routes of other slugs returning to other nests. All of the individuals belonging to one nest-community, even though they may have been widely separated while feeding, begin the return journey at almost the same moment. (TETS 209-10)

The slugs she describes display an almost collective unconscious as well as an amazing degree of discretion and symmetry in their behavior. Reinforcing community attachment, and in this case, collectivisim, Carson incorporates repetitive narrative strategies in her description. The passage contains multiple references to nests, home nests, and community nests, suggestions of sophisticated social organization, and examples of precise coordination of individuals conducted in the absence of an overt system of organization.

Suggesting similar coordination of movement and collectivity in design, Carson describes the spectacular mass movement of mole crabs like "the flocking of birds or the schooling of fish" when suddenly, the sand on the beach seems to bubble and "in a strange concerted action" they emerge as a united front as a wave sweeps over them (TETS 153). Similarly collective, though more obviously cooperative, chitons carry

neighborhoods of algae spores, barnacle larvae and tube-building worms atop their primitive bodies. They have the habit of gathering together periodically to clean house. Carson explains that at such times, chitons pile up in dark, west caves, one on top of another and scrape each other's backs (TETS 208). As a result of their cooperative behavior, these mollusks become agents of significant geologic change in their own, small way. As they feed on rocks, they remove minute mineral scrapings along with the algae, "and so, over the centuries and the millennia in which this ancient race of beings has lived its simple life" each one has contributed to "the process of erosion by which earth surfaces are worn away" (TETS 209). With local rather than global impact, the individual feeding activities of the hydroid Sertularians, "contributes to the nourishment of the whole colony" (TETS 116). Contrary to a Western social world that prizes individuality, competition, and hierarchical organization, Carson finds a natural world prosperous with beings living collectively, organized cooperatively with each other, with unrelated others, and even compatibly with their surroundings.

Although Carson was not squeamish about addressing the brutality or rapaciousness of predator-prey relationships, she preferred again and again to promote partnerships and mutually beneficial interactions.[12] Beings are not shown as passive victims on a competitive food chain, but as active participants in domestic activities and cooperative members of communities. Significantly, Carson admits that "the link between tide and living creature [she likes] best to remember is that of a very small worm, flat of body, with no distinction of appearance, but with one unforgettable quality" (TSAU 162). She explains in detail that,

> Convoluta has entered into a remarkable partnership with green alga, whose cells inhabit the body of the worm and lend to its tissues their own green color. The worm lives entirely on the starchy products manufactured by its plant guest, having become so completely dependent

> upon this means of nutrition that its digestive organs have degenerated [. . .]. (TSAU 162)

When the tide is out, the worms emerge from their borrows and lay on the sunny sand so the alga that live within them can photosynthesize. When the tide comes in, Convoluta anchors its communal self in the sand and waits in safe repose until the next low tide. In other examples of intimate and enduring partnerships, Carson reports on a habit among parchment worms "to acquire lodgers [like] the small pea crabs whose relatives inhabit the burrows of the ghost shrimps" (TETS 149). Queen conch and cardinal fish have a similar arrangement. The conch offers nearly impenetrable armor and when danger threatens, the fish "darts into the fleshy cavern deep within the shell of the conch" where it is completely protected (TETS 232). In all of these examples, Carson highlights interaction that is cooperative and collaborative, and sometimes these interactions occur in the absence of an obvious benefit for one of the participants.

With a steady focus on the blurry boundaries between individuals in communities and between living beings and their homes, Carson directly challenged tenets central to the organization of patriarchal institutions. For example, "[a]t first glance a colony of Botryllus may seem no more complex than a mat of encrusting sponge. In actual fact, however, each of the individuals compromising the colony is a highly organized creature" (TETS 67-8). She explains that Velella is "not one animal but a composite one, or colony of inseparably associated individuals" and reveals that the "true nature" of Portuguese men-of-war is difficult to grasp, but "as with Velella, the central fact is that what appears to be one animal is really a colony of many different individuals, although no one of them could exist independently" (TETS 170-1). Each of these observations is buttressed by reminders of scientific "facts," while the following example relies on other, similarly persuasive value systems. On her own stretch of coast in Maine, where rockweeds swing and sway with each passing wave,

> the rocks are stained with vivid hues, painted in crimson and emerald by the activities of sea plants so minute that even in their thousands they seem but part of the rock, a surface revelation of jewel tones within. The green patches are growths of one of the green algae. The individual plants are so small that only a strong lens could reveal their identity—lost, as individual blades of grass are lost in the lush expanse of a meadow, in the spreading verdant stain created by the mass. Amid the green are other patches of a rich and intensely glowing red, and again the growth is not separable from the mineral floor. (TETS 79)

The weight of science is in evidence, this time in the form of a magnifying lens that is used to extend human eyesight and imagination in order to see what is actually there. The promise of clarity notwithstanding, Carson shows distinction between individuals that is ambiguous and living creatures that are almost indistinguishable from their homes on the rock. Yet it is not individuality that is lost, but community that is gained and the preciousness of this exchange is reflected in sumptuous language and images of gems.

In addition to promoting cooperation, collaboration, and collectivism, values associated with the woman-identified-woman and lesbian, Carson opens up a lesbian narrative space by blurring distinctions among individuals and between living beings and the landscapes they inhabit. For Marilyn R. Farwell, a lesbian space is made possible within narratives when the traditional binaries that fortify heterosexuality are obscured in such a way as to undercut the difference and opposition they rely on. In her essay, "Heterosexual Plots and Lesbian Subtexts: Toward a Theory of Lesbian Narrative Space," Farwell explains,

> It happens most often when two women seek another kind of relationship than that which is prescribed in the patriarchal structures, and when it occurs in the narrative, it can cast a different light on the rest of the

> [narrative], even on those portions that seem to affirm heterosexual patterns. (98)

For Farwell, the "master plot is not just androcentric or phallocentric, it is also basically heterosexual" (95). Though Carson did not address heterosexuality directly in the sea books, there are patterns of content and in narrative structure that undermine its foundations. Carson's reluctance to outline heterosexual reproductive unions discussed in chapter two could be viewed not only as interrupting sex and gender roles, but displacing the primacy of heterosexuality as well. In passages cited above, Carson blurs the distinctions between individuals and communities and downplays the differences necessary for substantiating heterosexual social privilege as well as the heterosexualization of the narrative.

In the last chapter I argued that Carson upset normative gender roles by providing alternative models for care giving. Now, I would like to point out that she interrupts heterosexuality by highlighting sexual transformation and ambiguity. In The Edge of the Sea, she notes that "all young limpets are males, later transforming to females—a circumstance not at all uncommon among mollusks" (61) and the small snail called a boar shell lives linked together in community chains and "is in its life first male then female" (178). Female eels undergo a surprising transformation before they begin their fantastic journey from shallow sweet rivers to deep salt abyss:

> Gradually the river garb of olive brown [changes] to a glistening black, with underparts of silver. These [are] the colors worn only by mature eels about to undertake a far sea journey. Their bodies were firm and rounded with fat [. . .]. Already in many of the migrants the snouts were becoming higher and more compressed [and their] eyes were enlarged twice their normal size [. . .]. (UTSW 226)

The transformation of female eels, which I will return to again, and the limpets and mollusks represent the most direct examples of Carson's usurpation of sex in order to undermine heterosexuality. If categories of sex and gender aren't stable or fixed, then the sexual orientation, which is based on such differences, is similarly unreliable.

Carson's challenge of heterosexual privilege is more circumspect than her critique of gender and sex roles, but it may be even more radical. During Carson's adult life, options for women who did not perform heterosexuality were increasingly restricted both inside the home and outside. Margaret Rossiter notes that, "[e]conomic insecurity and a rising antifeminism were an intimidating combination" for women scientists in government service during the 1920s and 1930s (235), although interestingly during World War II, Kate Adams finds at least temporary reprieve for "lesbians and other women on the margins of social norms" who were tolerated and even treated sympathetically in the military (268). However, according to Estelle Freedman, after the war,

> as popular and commercial culture elaborated upon white women's sexual availability, and when effective medical treatment of venereal disease made prostitutes seem less threatening than in the past, several new boundaries appeared to help shore up white, marital heterosexuality. The outlaws included the frigid career woman, the black welfare mother, and the prison lesbian. (430-1)

Later, during the 1950s and "mirroring the increased homophobia of the federal government at large" the military reversed its earlier tentative forbearance for homosexuals with "legal, medical, and religious warnings which declared that a charge of lesbianism meant the ruination of women's professional, personal, and social lives" (Adams 261). As an editor for government and military documents as well as a member of society, Carson could not have escaped exposure to such images, messages, and

materials, and she would not have been exempt from an increasingly chilly social climate for women and lesbians.

Social, political, and institutional trends were additionally bolstered by medical doctors and scientists who promoted both "serious psychological studies" as well as "pseudoscientific works" conflating the lesbian and the woman criminal (E. Freedman 429). At the same time,

> U.S. legislators were calling federally employed homosexuals "security risks" and medical professionals were attempting cures with treatments ranging from psychoanalysis and aversion therapy to electroshock and lobotomy. Although there were some researchers [. . .] who approached homosexuality as a non-pathological behavior, the "sickness theory" still held as the dominant view, partly because the professionals who employed it [. . .] were the ones most often published in the popular media. (Adams 265)[13]

At work and at home, Carson would have been inundated with McCarthy-era campaigns that identified homosexuals as sources of communist subversion and moral ruin (E. Freedman 435) and a medical profession that aggressively promoted an image of lesbians as maladjusted or mentally ill women to be cured by professional men.[14] Carson would have had good reason to feel vulnerable and to vigorously protect her privacy during the claustrophobic conservative culture that had been steadily intensifying after World War II into the 1950s, and beyond.

Although the evidence that Carson encountered and managed advancing waves of heterosexism is circumstantial and contextual, there is direct confirmation of her experience with and response to sexism in her careers, first as a government scientist and then as a popular nature writer. Carson had an excellent reputation as a hard worker and rose gradually through the ranks of the Bureau of Fisheries (and later the

U.S. Fish and Wildlife Service) after her initial contract in 1936.[15] Even so, Carson was not given responsibilities that reflected those normally assigned to the positions she occupied, and several positions were adjusted or actually created specifically for her (Lear, WFN 82, 94). At one point, when a higher ranking colleague vacated his position, Carson received his editorial responsibilities and a much welcomed pay increase, but not his title (Lear, WFN 515n45), and when she was promoted to assistant aquatic biologist, Lear notes:

> [Carson] performed no actual field investigations and only incidental laboratory work, functioning primarily as a research and reference assistant to [her supervisor], who turned over to her all his laboratory and field reports, which Carson then verified, referenced, and rewrote. (WFN 95)

Like many women scientists in government service, Carson was trapped within a kind of double bind: even though she conducted herself successfully in the public sphere and earned the status of scientist, she was made vulnerable by social restrictions regarding gender which she eschewed.[16]

Indeed, there is interesting and conclusive evidence that during Carson's career, she confronted sexism, was conscious of its power over her, and even that she employed various strategies to conceal her sex or cloak her gender. During her time of government service, Carson hid her gender by using initials instead of her name on publications because "she and her supervisors agreed her views would be taken more seriously if it were assumed that she was a man" (Lear; WFN 503n69). It was a habit she continued throughout her government career, although frequently, her work as an editor and glorified research assistant rendered her participation and investment invisible, anyway. Carson employed other strategies to deflect and distract unwanted attention when she began to gain attention because of the popularity of the sea books.

Though I will address these strategies in a moment, I'll suggest now that she may have assumed feminine trappings as camouflage to divert any attention that might jeopardize her work, her lifestyle, or her responsibilities to others.

It was not possible for Carson to escape sexist impediments in her government work and it was similarly impossible for her to avoid sexism in response to her work as a nature writer. Witness for Nature is rife with examples of the sexist trends and offenses that impacted Carson, and Lear is quite clear about her position on these matters. Following the publication of The Sea Around Us, Lear explains that:

> The sexism that greeted Carson and her sudden fame is not as surprising as its blatant crudeness is striking. Many male readers, and certainly the scientific community, were reluctant to admit that a woman could deal with a scientific subject of such scope and complexity. Perhaps thinking Rachel Carson was a pen name, one reader wrote, "I assume from the author's knowledge that he must be a man." (WFN 206)

In addition, there is evidence that Carson was conscious of much of this influence. Norwood reports that Carson was "surprised and amused by some male readers' reluctance to acknowledge that a woman could have dealt with a scientific subject" and their attempt to rationalize the problem by addressing her as 'Sir,'" (150). Elsewhere and more compellingly, Norwood notes that, when "a room full of professionally trained government employees, all of whom were male, dismissed the concerns of a female citizen out of hand, Carson recognized that gender stereotypes played a role in that denial" (159). Although most scholars point to the sexism Carson encountered during the fallout after the publication of Silent Spring, the slings and arrows of sexist insult and injury prior to that allowed her to prepare at least some defensive strategies to protect herself.

Once Carson's writing began earning her attention, public speculation regarding her appearance and manner were quick to follow. Although she found attention to her gender unwanted and demeaning (Lear, WFN 207), unfortunately for Carson, categorizing her by physical characteristics (real and imagined) and gender markers (real and imagined) was common among her contemporaries and has been popular with more recent biographers and scholars. In 1951, during an interview with Cyrus Durgin of the *Boston Globe*, Carson "talked about her early interest in the sea and her scientific education" although the published version of his article focused almost entirely on her gender (Lear, WFN 210). Durgin wrote:

> Would you imagine a woman who has written about the seven seas and their wonders to be a hearty physical type? Not Miss Carson. She is small and slender, with chestnut hair and eyes whose color has something of both the green and blue of sea water. She is trim and feminine, wears soft pink nail polish and uses lipstick and powder expertly, but sparingly. (Lear, WFN 210)

In some ways, characterizations that emphasized typically feminine traits reduced the sense that Carson might be a threat to patriarchal institutions; in other ways, such descriptions obscured the ways in which she resisted patriarchally inscribed gender roles and compulsory heterosexuality.

Carson's experience as a woman-identified-woman and a lesbian informed her interpretation of the natural world, shaped readers' understanding of her work, influenced how readers imagined her, and determined many of the opportunities that were availed or denied her.[17] Carson's gender permitted broad concern for domestic issues and she used that concern to deflect attention away from her portrayal and privileging of alternative domestic models in her writing. Her gender made her vulnerable to criticism and attacks that could limit or even prohibit her access to public

discourse as well as social resources. According to Diane Freedman in An Alchemy of Genres: Cross-Genre Writing by American Feminist Poet-Critics, "women seeking alternatives to male-dominated discourse worry that the very anomalousness of their writing will keep them from being heard" (D. Freedman 26). Therefore, women (and other marginalized) writers have utilized a range of strategies to augment their reach to readers. Some writers have been successful communicating their experience by incorporating domestic imagery and weaving "the practical and material aspects of their lives into a literary mosaic" (D. Freedman 69). Others, like the writers discussed in Farwell's essay (mentioned earlier), and Adams' essay (discussed below), cloaked profoundly radical messages in the most conventional of narrative forms.

Writers discussed by Farwell in her essay, from Toni Morrison to Marion Zimmer Bradley, break with patriarchy when they usurp conventional narratives and insert strategies in order to promote alternative (in these cases, lesbian) perspectives. Farwell claims that "a lesbian narrative space [is] a disruptive space of sameness as opposed to difference which has structured most Western narratives" (93). In "Making the World Safe for the Missionary Position: Images of the Lesbian in Post-World War II America," Adams compares two novels with contrasting images of lesbians, both published in the 1950s. The first, Tereska Torrès's salacious Women's Barracks represents "lesbian sexuality and the independent woman as threats to bourgeois culture and to its ideals of 'normal womanhood,'" and the second, less sensational and more dimensioned, The Price of Salt by Patricia Highsmith, "creates a positive image of the lesbian" and delivers "an extraordinary subversive message, but [. . .] in a highly conventional, genteel narrative structure" (Adams 257).[18] For Adams, an examination and comparison of these two novels suggests that mid-twentieth century readers recognized lesbians only when they appeared "clothed in the cultural assumptions" readers expected (258). In

the absence of those trappings, the lesbian was rendered invisible within the narrative as well as within society.

There is evidence that Carson cloaked her most radical critiques in narrative strategies that permitted them to pass because they appeared conventionally acceptable. In "Strategies of Coding in Women's Cultures," Joan Radner and Susan Lanser have found,

> in the creation and performance of dominated cultures, [. . .] covert expressions of ideas, beliefs, experiences, feelings, and attitudes that the dominant culture—and perhaps even the dominated group—would find disturbing or threatening if expressed in more overt forms. (4)

Radner and Lanser identify a number of examples of coding in narratives by women, including manifestations of appropriation, distancing, distraction, and juxtaposition. While I suspect the sea books demonstrate a variety of coding strategies, I will focus on only two, here, both relating to Carson's use of particular metaphors to describe the natural world. For example, Carson lays the groundwork for a lesbian narrative space by the seemingly unobtrusive patterns in her use of metaphors to describe the natural world.[19] Later, I will suggest how the pairing of symbol and signifier promotes the emergence of an erotic desire that is both feminine (in terms of gender) and lesbian. But first, I will investigate coding strategies of juxtaposition and distraction.

According to Radner and Lanser, juxtaposition is "a particularly ambiguous coding strategy" in part because interpretation is a process that occurs only within specific contexts, whereby "an item that in one environment seems unremarkable or unambiguous may develop quite tendentious levels of meaning in another" (14, 13). The most prominent examples of juxtaposition evident in the sea books are startling not because of their differences, but because of their similarities. Carson consistently employed metaphors *from* the natural world in her descriptions *of* the natural world.

Luminescent creatures "glitter with a thousand thousand moving pin pricks of light, like an immense swarm of fireflies moving through a dark wood" (TSAU 32), coquina shells are shaped like butterflies (TETS 157), and mackerel rushing through incoming flood waters leap "high in the air again and again, sparkling bits of animate silver, like a swarm of glittering insects that rose and fell, rose again and fell" (UTSW 83-4). These images are spectacular and relentless in the sea books. Tuna fall upon their prey "like a pack of wolves" (UTSW 193), a sting ray is "a large, batlike creature" (UTSW 169), and ctenophore tentacles are "filmy and tenuous as the strands of a spider's web" (UTSW 135). Plants may seem like more familiar terrestrial types when comb jellies remind her of gooseberries in both Under the Sea-Wind (118) and The Sea Around Us (20) and sea anemones are comprised of flowerlets (UTSW 96). The consistent, frequent, and repetitive juxtaposition of such pairings suggest the regularity of a code.

In many of the examples just mentioned, Carson metaphorically substitutes one animal for another, or one plant for another, but she also makes interesting comparisons by linking similarities among landscapes. Stands of sea tangles and tall striped laminarias are "an Atlantic counterpart of the great submarine jungles of the Pacific, where kelp rises like giant forest trees" (TETS 70) and "like a tropical jungle with its orchids, this sea forest has the counterpart of airplants in the epiphytic tufts of a red seaweed that grows on the fronds" of knotted sea wracks (TETS 80). For Gartner, the "relationship reflected most often in Carson's imagery is that of the land and the sea" and these "references to the land [make] the unknown sea more familiar" to readers (43, 56). A clear illustration of this can be seen in Carson's description of the west coast of Scotland where a dark, dense thicket of Laminarias provide a canopy of undulating fronds to block out the sun's rays as divers enjoy aquatic hike. In an area where the "forest" opened into a clearing, there was light and the divers could easily walk between the plants. According to Carson,

> through misty water they could see this more open "park" extending farther down the sloping floor of the sea. Among the holdfasts and stripes of the laminarias, as among the roots and trunks of a terrestrial forest, was a dense undergrowth, here formed of red algae. And as small rodents and other creatures have their dens and runways under the forest trees, so a varied and abundant fauna lived on and among the holdfasts of the great seaweeds. (TETS 71)

Similarly, whales complete a pastoral landscape as they browse in plankton meadows (TSAU 33) and fish move over the plains of the continental shelf like herds of cattle (TSAU 59). Pollock bodies gleam "white as the wave froth" (UTSW 162) and "puffs of blown spume or sea froth [roll] like thistledown" (UTSW 26). While such close parallels between land and sea allow readers comfortable access to an unfamiliar world, they also reinforce a sense of interconnection. For me, the prevailing and insistent catalog of associations that juxtapose signifiers with only similar symbols may suggests something else: a compelling critique of difference, particularly as it props up heterosexual privilege.

By juxtaposing images from the natural world to describe the natural world, Carson reinforces continuity and creates a narrative space reflecting aesthetic homogeneity and similarities among physical characteristics. Farwell reports that feminist theorists from a variety of theoretical allegiances "have explored the importance of women's bonding, often termed lesbian whatever the sexuality of the women, as a powerful tool for breaking narrative codes" (93). She continues to claim that, because "female desire within the dichotomous structures of male thinking is inconceivable," women's desire will only be possible in narratives that provide a "space of sameness" (Farwell 98). In her coupling of like image with like, Carson not only confronts the divisiveness of difference, but imagines a world joined by shared experience and similarity of perspective or experience. In addition, her establishment of a safe space of

sameness allowed her to explore sensual and erotic aspects of lesbian experience, issues I will return to presently. For now, I want to remain focused on the implications of Carson's covert narrative strategies and her critiques of patriarchal ideology and institutions in the sea books. For Radner and Lanser,

> a context for implicit coding exists when there is a situation of oppression, dominance, or risk for a particular individual or identifiable group, when there is some kind of opposition to this situation that cannot safely be made explicit; and when there is a community of potential "listeners" from which one would want to protect oneself. (9)

Carson was vulnerable to scrutiny because she was a woman and because she was a professional women responsible for the support of her family. Given the context provided in this chapter, I think it is fair to propose that she would have suffered social sanction, been targeted for containment, and perhaps even "treatment" had she tried to live openly as a lesbian.

Instead, Carson took steps to protect herself from a prying patriarchal gaze in several discernable ways. During her years of government service, she was cautious not to share too many of her political attitudes or her criticism of the government (Lear, WFN 257). But Carson could be much more surreptitious in the strategies she used to hide information that could be used against her. Later in this chapter, I will disclose the lengths Carson went to in order to maintain control over her most revealing and intimate correspondence by hiding and destroying letters, and obligating others to do the same. More interesting to me now are the similarities between strategies she employed to conceal aspects of her life and the coding strategies she employed to cloak her critique of patriarchy in the sea books. For example, I believe Carson cultivated the cover of an overtly feminine character in order to pass discreetly through many social and professional scenes.

Although biographers and critics have noticed that Carson was practical, unassuming, and down to earth in both demeanor and dress, they have also reiterated conflicting reports of her feminine form, delicate constitution, and natty attire. Despite frequent remarks on Carson's tiny frame, trim figure, and petite stature (images loaded with gendered innuendo), Carson was actually quite "strong, physically fit and well coordinated" (Lear, WFN 101). Prior to attending college, she described herself as "intensely fond of anything pertaining to the outdoors and athletics," and during her freshman year of college, her extracurricular activities centered on sports rather than literature (Lear, WFN 32). Later, she would demonstrate incredible fortitude and stamina when carrying out rigorous field research. On the one and only occasion she was able to dive underwater, her equipment included an eighty-four pound diving helmet (Lear, WFN 168)! Left to her own devices, Carson was practical and dressed plainly to accommodate her time out of doors. For Lear, Carson followed her mother's example in matters of dress and "never attached any importance to physical appearance," although during her professional career, she was certainly "conscious of her physical appearance and determined to rebut the perverted image of the female scientist" (WFN 30, 215).

For Leopold, it was perfectly appropriate for Carson to exercise artifice in order to protect herself from public scrutiny. She explains that as "a professional woman of her generation, Carson was [. . .] quite familiar with the need to keep up a firewall between her working life and her private life" (140), although Leopold does not clearly articulate why that firewall might have been necessary.[20] For me, Carson's consciousness to countenance and dress were guided by her desire to mask her identity, to cloak her lifestyle, and finally to protect her privacy and the privacy of those she loved. She clearly recognized the benefits of disguise and actively practiced strategies of subterfuge in her life. Frequently, this strategy successfully disarmed critics and earned admirers. On

one occasion, Lear describes a cosmopolitan Carson as she met with a reporter in Detroit:

> Carson alighted from the plane wearing a pert white straw hat with a rhinestone-dotted veil and a chiffon scarf knotted softly at the neck underneath her fur topper and carrying her hat box. The reporter, startled by Carson's fashionable and feminine appearance, quickly uncovered the scientist [. . .]. (WFN 259)

One colleague who traveled to Maine to visit Carson recalled being initially surprised by "the shy, almost timid, and rather plain woman who met him," and another remembered hearing Carson speak publicly for the first time and being "unexpectedly charmed by her feminine demeanor and her calm, reflective manner" (Lear, WFN 330, 441). A frequent companion on research and birding adventures, Briggs expressed playful consternation that Carson "never seemed to get as wet, muddy, or disheveled as she did and that no matter what the excursion, Rachel emerged looking neat and ladylike" (Lear, WFN 133). It is interesting to consider how much at odds are these images of Carson compared to those of the viraginous sea goddess that some readers of the sea books imagined,[21] or the bent, bitter spinster promoted by critics of Silent Spring.

When formal dress was required, Carson assumed dominant trends in order to appear well appointed and fashionable. Perhaps imagining that such associations might make her less of a target, Carson was frequently praised for her conservative guise and feminine bearing. When she accepted the prestigious National Book Award for The Sea Around Us in 1952, Carson was "stylishly polished but conservative in a dark silk dress and the same feathered toque that she favored for all of her important public occasions" (Lear, WFN 218). At an Audubon Society lecture, Carson wore a "navy taffeta dress with a wide white collar and a new white hat she bought to brighten up the outfit," and "a full-length deep-blue evening gown with her sapphire and rhinestone earrings and

bracelet" when she accepted the Achievement Award from the American Association of University Women (Lear, WFN 266, 286). These descriptions of delicate comportment and feminine flair, which were reported by Lear but gleaned from public accounts in newspapers as well as personal correspondence, suggest an underlying determination and design.

There is, in fact, evidence that is both direct and circumstantial that Carson consciously used disguise and subterfuge when negotiating social, public, and professional engagements. In 1946, Carson, Briggs, and Kay Howe were on assignment at Parker River on the coast of northern Massachusetts, collecting information for the Fish and Wildlife Service's *Conservation in Action Series.* Fearing local antipathy toward them as representatives of the government, Briggs made disguises for the trio (Lear, WFN 527n43). In 1951, when Carson was beginning to feel the invasiveness of celebrity status, her mother observed that she might avoid unwanted attention and speculation by re-using Briggs' disguises from Parker River (Lear, WFN 210). Carson was amused and perhaps even tempted, but demurred the offer.

More recently, in Living Downstream: A Scientist's Personal Investigation of Cancer and the Environment, Sandra Steingraber exposed another example of successful misdirection in Carson's purposeful manipulation of her appearance to hide realities in her life. Following a detailed review of photographs and film clips from public appearances late in her life, Steingraber claims that Carson looked "for all intents and purposes like a woman in treatment for cancer" (25), yet there is no mention of her illness, anywhere. Steingraber notes that Carson wore an "unfortunate black wig," that her "face and neck exhibit the distorting puffiness characteristic of radiation," and that she held herself "in the ginger, upright manner of one who has undergone surgery" (25-6). Suggesting the surprising success of Carson's effort to hide her illness, Steingraber reports that,

> newspaper clippings in the Beineke Library that trace her various public appearances in the waning days of her life are full of elaborate descriptions of what type of elegant suit Miss Carson chose to wear and how delightfully she comported herself. (26)

Steingraber speaks of the many silences in Carson's life, from those she enforced herself (as when she hid her illness), to those imposed on her (as when scientific institutions in league with chemical-producing industries sought to discredit her). For Steingraber, "not seeing is another form of silence" (25), and refers to both the disquieting reluctance to recognize the person behind the portrait, as well as the disturbing (and ongoing) unwillingness to concede the important connections Carson drew between cancer and the environment.

Carson's emphasis on projecting an appropriate appearance during the latter stages of her life when she suffered from unrelenting symptoms of illness and chronic, persistent pain, is both compelling and heart-wrenching. Prior to the publication of Silent Spring, she anticipated "the public attention that would focus on her" and became increasingly determined to hide her cancer diagnosis and treatment (Lear, WFN 404). She implored her lover to help hide the truth from the public, as well as many of those closest to her. In a letter to Dorothy Freeman, Carson tried to convince her that there was no reason to tell anyone that she had not been well, and that if Freeman felt she must share something, she could "say I had a bad time with iritis that delayed my work but it has cleared up nicely. And that you *never saw me look better.* Please say that" (Lear, WFN 404). Carson's pleading directive and the emphasis she placed on how she *looked*, suggests a high degree of concern and deliberation regarding her appearance. This letter is a sad acknowledgement of Carson's preoccupation with promoting a particular image of herself and provides strong evidence that her manipulation of feminine trappings were conscious bids for pageantry with purpose.

Carson recognized and utilized the benefits of subterfuge and disguise in her own life, and she demonstrated similar strategies in the sea books, signaled first by images of beings cloaked and clothed. For example, emerging from immaturity, Scomber "put on the sea coat of the adult mackerel. He was clothed in scales, but they were so fine and small that he was soft as velvet to the touch" (UTSW 140). Periwinkles below the moss zone "wear little patches of pink on their shells" which match the rocks and fissures surrounding them, and "the rock bottom that slants away into green water carries down the rose as far as the eye can follow" (TETS 107). Fishes, squids and dolphins "clothe themselves in a ghostly radiance" produced by the protozoa Noctiluca's luminescence (TSAU 32), and trees along the coast both living and dead "are clothed with green and silver crusts of lichens" (TETS 41). In deep water, most fishes wear "silver armor," silver being "the prevailing color or badge of those waters that lie at the end of the sun's rays" (UTSW 259) and in water deeper still, fishes are "black, deep violet, and purple" although their "scarlet raiment... can only look black to their neighbors" because the red rays have already been strained out of the water at such depths (TSAU 50). In these passages, descriptions of dress are startling in their richness and vibrancy. But combined with narrative rhythms and repetitive sounds, the effect is appealing and engaging, rather than overtly distracting.

References to enchanting vestments give way to more direct references to dress as a disguise for purposes of concealment, like on the tundra, where Carson connects cover and clothing in a pleasingly poetic passage. She writes, "[w]hen a ptarmigan in winter dress feeds on the snow fields, all of color about him is the black of bill and roving eye, and of the under tail feathers when he flies" (UTSW 54). Despite the seeming stark simplicity of the contrast between white and black, between snowfields and facial features, there is the intriguing complicity of camouflage, and a cadence that is quite complex. Finally, "in silver wedding dress" the sororal bands of eels already mentioned

once or twice (for they are among my favorite characters and account for much of the narrative of Under the Sea-Wind) follow ebbing tides into the sea to "lose themselves in the black abysses of the mid-ocean" (UTSW 79). Carson's description of the eels, like that of the ptarmigan above, contains both accuracies and ambiguities. For the eels, it is a one-way trip, undertaken strictly for purposes of procreation. Afterwards, the parent eels will die, and their progeny will return to their former homes. The metaphorical marriage of Carson's eels is not to male eels, but each to her own death. There is certainly something haunting and sad about a sisterhood that is lost in such a reproductive cycle. Indeed, it reminds me of the concept of compulsory heterosexuality advanced by Rich and others.[22]

The sea books are filled with more general descriptions of the use of disguise as an effective strategy for survival. The pattern of surface waters contain many marine beasts in weedy jungles playing "elaborate game[s] of disguise in which each is camouflaged to hide it from others" (TSAU 26) and on the coral coast, sea horses are camouflaged so effectively "that only the sharpest eye can detect one at rest, its flexible tail gripping a blade of grass and its bony little body leaning out into the currents like a piece of vegetation" (TETS 234). An angler's body has "ragged tatters of skin streamed out into the water, giving the fish the appearance of a rock grown with seaweeds" (UTSW 244). At times, her admiration for disguise as a craft is obvious, as when she recognizes the skillful camouflage of arctic creatures where "only by sudden movement did a nesting bird or a foraging lemming betray its presence" (UTSW 61). Similarly, she notes that the "only clues to the inhabitants of most beaches are found in winding tracks, in slight movements disturbing the upper layers, or in barely protruding tubes and all but concealed openings leading down to hidden burrows" (TETS 131). No longer attached to images of dress, the disguises in the passages above are still suggestive of camouflage and concealment employed for misdirection and for protection.

Disguise may also provide strategic advantages in addition to enhanced safety. Disguise may facilitate hunting, as it does for squid whose body pigments change to reflect its surroundings. Fish school and swim above where it lies in motionless invisibility on the underlying sea floor, until "what had appeared a water-mounded ridge of sand suddenly [whirls] up from the bottom and [seizes] them" (UTSW 150). Disguise may also conceal unpleasant or unwanted realities, as it does for Carson during one revealing moment along the coast of Maine. She recalls an ambient morning when the mist lingered long and continued to conceal the "lighthouse and fishing boats and all other reminders of man" for some time (TETS 44). The mist obscures reality, the way a disguise obscures identity. Clearly for Carson, examples of concealment and disguise offer many possibilities to enhance survival, including the opportunity to escape from man-made environments—even if only imaginatively, even if only temporarily.

Carson escaped into the natural world whenever she could, but she also enjoyed respite in relationships with others. Carson met Dorothy Freeman during the most restrictive years of the mid-twentieth century and began what was probably her most significant lesbian attachment since her involvement with Skinker. Carson and Freeman corresponded briefly before Carson and her mother moved into their new cottage near the Freemans' summer home in Maine. By the time they had their first meeting, they'd already discovered a "shared a love of nature, the ocean, and cats as well as the care of an elderly mother" (Lear, WFN 244). Carson invited the Freemans by for some tide-pooling and "although it was a neap tide, they could gather some interesting creatures to look at under Rachel's microscope and have a cup of tea together" (Lear, WFN 245). Freeman was an accomplished naturalist in her own right, "completely comfortable in the outdoors, and particularly interested in birds, native plants, and marine life" (Lear, WFN 247). Prior to marrying, she'd taught high school home economics and worked for the Massachusetts Department of Agriculture where she became the first woman to hold the

position of regional director of 4H (Lear, WFN 246). When Carson and Freeman met, Freeman was "outgoing, exuberant, easily affectionate, and immensely empathetic," and at 55, she was nine years Carson's senior, (Lear, WFN 246). They took to each other immediately and with great intensity, urgency, and affection.

Carson and Freeman pursued their relationship with zeal and exchanged a flurry of correspondence articulating the fits and starts of intense feeling and the need for assurance and validation. The letters that have survived and those that are available suggest that while the "longing and anxiety to be certain of each other's love and commitment were mutual," Carson seems the initiator, "the one who shaped the relationship, made plans to meet, as well as the confident partner who reassured a tentative and self-effacing [Freeman] of her worthiness" (Lear, WFN 533-4n13). The intensity of their relationship accelerated because Freeman, like Carson, turned out to be an ardent letter writer. Both contributed to, and enjoyed participation in diverse epistolary communities. For Freeman, "letter writing was a form of literary expression perfectly suited to her outgoing and affectionate personality. It was also an emotional outlet, a Christian duty, and a private passion" (Lear, WFN 247). Despite satisfying correspondence and frequent, captivating conversations on the telephone, Carson "had no intention of allowing this relationship to be based" wholly or even mostly on letters and telephone calls (Lear, WFN 249). Instead, she went to great pains to arrange time together and made sure to include time for just the two of them.[23]

Theirs was a relationship of sweet felicity and affection, based on shared sympathies, mutual understanding, unwavering devotion, and not without sensual delight. Their first encounter was an Epicurean adventure by the edge of the sea that ended with an impulsive kiss (Lear, WFN 246). Once, when the Freemans took Carson out for a brief sail on their boat, Dorothy found an excuse in a frightening moment to hold her hand (Lear, WFN 263). They considered each other "kindred spirits" (Lear, WFN

255) and were incredibly effusive, littering letters liberally with "my dearest love always," "all my love," "my dearest," and "my darling" (Lear, WFN 249). Once, Dorothy admitted, though "shyly that she was physically and emotionally 'stirred' whenever she saw or heard a public reference to Rachel, an admission that pleased Carson enormously" (Lear, WFN 256). Perhaps the breadth and depth of their affection caused its tensile strength because according to Lear, "to love Rachel Carson and to live creatively by nurturing her" meant that:

> Rachel's work and her physical and psychological needs came first, and Dorothy, accustomed to the role of nurturer, accepted that and willingly endured the keen emotional deprivation that it sometimes brought her. (WFN 255)

Especially towards the end of her life, Carson would find "solace in an oasis of Dorothy's care" when they were together (Lear, WFN 474), but their time together was always brief and never frequent enough for either one.

Both Carson and Freeman regularly lamented the fact that they were physically separated for much of their involvement. They were next door to each other only during summers in Maine. Dorothy and husband Stan had a grown and married son, and a new baby granddaughter that they wanted to see as often as possible (Lear, WFN 247).[24] While the two Freeman households were separated by some distance, they were nonetheless close as a family and spent time together on holidays and over the summer; in fact, they had taken turns reading The Sea Around Us aloud to each other the summer prior to meeting its famous author (Lear, WFN 244). Further obligating Freeman's time, was that she cared for an elderly mother who lived with her. For most of the year, Freeman lived in West Bridgewater, Massachusetts, and Carson in Silver Springs, Maryland. The distance between their respective homes, demanding family

obligations they shouldered individually, combined with Carson's hectic professional schedule, thwarted many plans and curtailed much of their time together.

In spite of the potential for real and catastrophic consequences for her close and loving involvement with women, Carson chose to deflect attention away from personal affairs and protect intimate relationships, rather than to submit to the tyranny of compulsory heterosexuality or to avoid intimacy altogether. The purposeful coding activities outlined below suggest that Carson was both aware of and responsive to, a homophobic and heterosexist social climate, in ways similar to the savvy she showed in regard to the gender discrimination and sexism she encountered in her work and in some responses to her writing. Lear notes Carson "took great pains to protect" the relationship between herself and Skinker (WFN 479n59) and she was similarly protective of her other relationships, sometimes, protecting her privacy included guarding against the hurt feelings of other loved ones. Early in her relationship with Freeman, they decided together to ease feelings of awkwardness and short circuit potential jealousies by sometimes exchanging two letters in one envelope, including

> a "public" one, and a private one folded and tucked inside. While their public letters were read by Dorothy's husband and mother, or by Rachel's mother or niece, their private letters were intended only for each other. (Hynes, "Together Forever" 15)

In this example, it is clear that Carson engaged coding strategies to keep aspects of her interaction with her lovers to herself. For the most part, however, strategies suggestive of those described by Radner and Lanser (in regard to narrative technique) and Rich (in regard to a lesbian continuum) were deployed to protect herself and the relationships she cherished from imperious, probing public eyes and the potentially devastating repercussions of exposure.

There are quite a few direct cases of codes developed between Carson and the women she loved. For example, she and Freeman developed a private coded language between them. According to Lear, they referred to the letters within letters (mentioned above) as "apples," and when "they both wrote of the same thing, or thought the same way about something, which happened with increasing frequency, they called it 'stardust'" (WFN 252). Particularly meaningful exchanges earned their own names such as "The Revelation" letters of February 1954 and the "white hyacinth letter" of the same year (Lear, WFN 255, 253).[25] Carson shared code words with others as well. She would experience moments of serendipity similar to those shared with Freeman with Knecht and called them by the same name (Lear, WFN 556n50). Finally, even Carson and her mother, "both somewhat obsessive about correct grammar, wrote humorous letters to each other using a kind of country dialect" which Lear identifies as "an affectionate code" between mother and daughter (WFN 527n36).

Further suggesting the degree of Carson's sensitivity to prevailing currents of homophobia and heterosexism in the culture at large, there is compelling evidence of the extent to which she feared discovery of particularly intimate details of her personal life. Despite all of their precautions, their mutual understanding, and their secret language, Carson and Freeman worried that their letters might fall into the wrong hands and even be made public. According to Wilson, there are indications in the letters between Carson and Freeman that they "were afraid of what the public might 'read into' their relationship" (Wilson 51). Letters that revealed painful personal details—particularly those relating to family members—and letters that might be misinterpreted would be destroyed, or "put in 'the strong box,' which was their code word for the same thing" (Lear, WFN 253). Sometimes they destroyed letters together, burning them as they did in the fall of 1954 (Lear, WFN 535n53). At other times, letters were destroyed separately at the request of one or the other, or by each at her own discretion. Carson

expressed her fear to Freeman, claiming that she shuddered every time she saw an "announcement of the publication of some poor wretch's letters" (Lear, WFN 263). In 1954, prior to leaving Maryland for the summer in Maine, Carson informed Freeman that she'd bundled up her letters and left strict instructions "that if anything happened to her, the letters were to be destroyed unread" (Lear, WFN 262). She then urged Freeman to do the same, and she did.

Carson risked great personal and material consequences in living, even covertly, as a lesbian. Therefore, she was perhaps understandably loath to leave traces of that life. At the same time, it is a bitter irony that efforts to conceal her identity as a woman-identified-woman and lesbian are implicated in the ideologies of oppression that threatened her well-being in the first place. In addition to letters destroyed by Carson and Freeman, letters between Carson and Skinker are missing and probably no longer exist (Lear, WFN 149). Furthermore, the destruction of revealing correspondence and other documents became a trend that was continued by Carson's family, associates, colleagues, and perpetuated by later biographers and others, making Carson's lesbian history that much more difficult to trace.[26] According to Rich, the "destruction of records and memorabilia and letters documenting the realities of lesbian existence must be taken very seriously as a means of keeping heterosexuality compulsory for women" (Rich 52).[27] Notes and correspondence committed to paper are precious and delicate, too easily lost and too readily done away with. Thus, the disappearance of documents recording women's love for one another has contributed significantly to the systematic erasure of a legacy of lesbian experience.

In her adult life, Carson had to hide much and the cost of her discretion was high. Though she would seek shelter in Freeman's care only late in her life, Carson regularly escaped to the shelter of the natural world throughout her life. Examples are plenty, from her earliest years when "enforced absences from school [were] spent wandering in

the orchards and woods" around her home (McCay 3) to the last days of her life. In her youth, when the population of the tiny, isolated Homestead in Springdale reached critical mass, Carson escaped and "found solitude in the woods" whenever she could (Lear, WFN 34),[28] and friends from her college years recall field trips and other excursions to the natural world made mystical when Carson was afoot. One friend remembers a summer at Woods Hole when, during evening walks along the shore, Carson would "wander off by herself, silently watching the ocean, utterly captivated by the sounds, smells, and rhythm of the ocean as well as by the variety of the marine life all around her" (Lear, WFN 61). These examples are among many that suggest Carson's time in nature was interactive, sensually stimulating, and frequently conducted when she was on her own.

Carson frequently escaped to the natural world on her own, alone. Maine was a paradise of seclusion to Carson and she would enjoy precious respite while there, and dream of returning when she was away. In 1938, she and her family (then including Maria and nieces Virginia and Marjorie) enjoyed a ten-day vacation in Maine, Carson spent much of it by herself, by the ocean. Always, "Rachel sought out the remotest sections of a beach" and on an isolated outer bank, "she found a particularly lovely stretch of wild ocean beach that she would use as the background for the chapters in Under the Sea-Wind" (Lear, WFN 93). She could not always make it alone, however, as when late in her life, she traveled to the Pacific Coast and visited Muir Woods. While she found the trip intellectually stimulating and deeply moving, there were bittersweet moments. In a letter to Freeman, Carson lamented how she'd "longed to wander off, *alone,* into the heart of the woods," in order to get a true feeling for the place. Instead, she was surround by people and confined to a wheelchair (Lear, WFN 465).

The shelter she sought in the woods was not always solitary. Sometimes, she spirited away a lucky friend or two along with her. Rodell and Freeman were both

frequent tide-pooling pals and when Marjorie Spock and her partner Polly Richards visited Carson in Maine, she "invited them down to the tide pools, a suggestion Spock recognized as an immediate lure to get some privacy and continue their conversation uninterrupted" by Maria or Spock's own elderly mother (Lear, WFN 331). In addition, Carson imagined the love between her and Freeman as a beautiful and serene natural space. In a note left under Freeman's pillow after spending New Years Eve 1964 together, Carson wrote,

> as long as either of us lives, I know our love "will never pass into nothingness" but will keep a quiet bower stored with peace and precious memories of all that we have shared. I need not say it again, but I shall—I love you, now and always. (Lear, WFN 475)

This love produced a physical manifestation in the acquisition and preservation of a forested symbol of their love, Lost Wood, a place they could share together (Lear, WFN 299). Although the reference is to a specific location (suggestive of shelter, particularly associated with women's private spaces), there are inflections too, here and elsewhere, of nature as a body. In addition, it is worth noting that her reference to an intimate bower suggests that the body of nature (at least here) has feminine appeal.

Carson and her loved ones found peace and release in the encircling embrace of the natural world and she recreated a similar intimacy in the sea books with passages pairing like-images that are startlingly romantic and even erotic. Among my favorite references are those that reflect heavenly bodies and universal systems. An inlet buoy is "a cosmos unto itself, rolling in the waters of the sound" (UTSW 96), some of the rocks along the Florida Keys are "as the surface of the moon might be" (TETS 206). Little fishes dash "like a shower of silver meteors" (UTSW 142), sounding mackerel are a splendid sight, "streaking by at top speed in a blaze of meteoric flashes" (UTSW 202), and schools of fishes avoiding the net are "like hundreds of darting comets" (UTSW

201). Walking along the beach, Carson notices star-like patterns twinkling in the firmament of sand and when the sand is disturbed, "the astral image" trembles and fades, "like a star disappearing in mist" as a starfish glides rapidly away (TETS 140).

Sometimes, these cosmic references strike me as incredibly sensual and even romantic as on dark nights when the sea lies calm under a wide sky, Carson notes little stars of plankton rival "in number and brilliance the constellations of the sky" (UTSW 123). Elsewhere, Carson observes that tide pools have many moods:

> At night they hold the stars and reflect the light of the Milky Way as it flows across the sky above them. Other, living stars come in from the sea: the shining emeralds of tiny phosphorescent diatoms—the glowing eyes of small fishes that swim at the surface of the dark water, their bodies slender as matchsticks, moving almost upright with little snouts uplifted—the elusive moonbeam flashes of comb jellies that have come in with a rising tide. (TETS 110-11)

These moods clearly expand to include erotic performance as revealed when Carson describes the border of wet sand retreating slowly down the beach as the tide falls toward the sea as "a dull velvet patch taking form on the shining silk of the water, like the back of an immense fish slowly rolling out of the sea" (TETS 146). The sensual timbre Carson finds in the curving movement of sand and the textured skin of water takes my breath away as it is; but such passages are made even more stirring by the coupling of images that are more alike than different.

Even more compelling are examples of interaction that position the natural world as more than a passive recipient available for Carson's escape, but a physical presence that offers and returns dynamic interaction. Carson reports on many such encounters in the sea books. For example, she describes moss that "forms so dense a covering that one cannot see what is beneath without intimate exploration" (TETS 95) and notes the

misconception of northern crabs as passive when, during the course of gentle exploration, she parts supple fronds of laminaria and is startled by the abrupt movement of a crab as it shifts its position in response (TETS 99). In The Edge of the Sea, Carson recalls another lovely, erotic encounter:

> [A]s my fingers explore among the dark red thongs of the dulse and push away the fronds of the Irish moss that cover the walls beneath me, I begin to find creatures of such extreme delicacy that I wonder how they can exist in this cave when the brute force of storm surf is unleashed within its confined space. (121)

Although Carson is obviously fascinated with things discrete and seemingly delicate, she is also aware that such beings must be actively searched for, because they are hidden under cover, covert and secretive. Even so, they are certainly worth the effort.

There is some interesting correspondence in the shift between the natural world providing shelter and nature's body as both receptive and capable of extending loving embraces which shed a different light on Carson's frequent desire to steal away to one or the other. Sometimes, it was indeed shelter she sought in the natural world; other times, I think she returned to nature to find a body as familiar, sensual, and responsive as a long-time lover's. According to Gretchen Legler, nature "has been inscribed in the same way that women's bodies and sexual pleasure have been inscribed in patriarchal discourse, as passive, interceptive, docile, as mirror and complement" and significantly, the "conceptual links between women and nature... make rewriting one part of rewriting the other" (Legler 233). In chapter two, I argued that Carson's rejection of sex and gender was radical because it denied patriarchal (and heterosexual) authority. Here it is significant that nature's body is like a woman's body, although that assertion is radical, too. By yoking together metaphors that reinforce sameness, by imbuing those references with sensual and erotic appeal, and by recasting nature from passive to

responsive, Carson details lesbian desire and further opens a lesbian narrative space within the sea books, and the result of all of this is a celebratory promotion of lesbianism.

Nature was clearly Carson's other lover. She returns again and again to the same coast in Maine, to the junipers and bayberries she loves, to the rocks and tide pools that received her gentle approaches and returned her tender embraces. Repeated possessive declarations of her shore, her coast, her own stretch of beach ring like endearments rather than statements of ownership. In addition, Carson's involvement with nature suggests perhaps her most enduring lesbian love affair. In the next chapter, "Living on the Edge: Locating the Other in Rachel Carson's Three Studies of Shores and Seas," I revisit the revisionary aspects of Carson's intimate interactions with the natural world from an ecofeminist perspective, but here want to conclude by asserting that it is time for Carson to be openly recognized as a member of the lesbian continuum Rich describes, and it is time for her life as well as her work to be embraced as reflecting lesbian existence.

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1 Interestingly, Lear adjusts an excerpt from this passage in the chapter devoted to Dorothy Freeman in Witness for Nature. "Nothing Lives Unto Itself" is the only chapter in Witness for Nature devoted entirely to personal relationships, particularly Carson's relationship with Freeman.

2 Issues related to home as I introduce them here are distinct from Carson's use of domestic metaphors. There are specific references to domestic items and spaces in the sea books, however, they are few and will be discussed with metaphors of borders and border crossing in chapter four, "Living on the Edge: Locating the Other in Rachel Carson's Three Studies of Shores and Seas." Here, I am concerned primarily with the concepts of home and community.

3 Not all women are woman-identified women and not all woman-identified women are lesbians, although for me, Carson was both. The term "woman-identified-woman" was first used in Radicalesbians: Notes from the Third Year as a way to divest patriarchally assigned labels and identities (including, in some circumstances, lesbian) and to draw attention to the possibilities of different perspective among women and some men. Later, Susan Cavin describes a useful model for understanding or contemplating woman-identified-women and gender ideology more generally as follows: "I divide society, history, sexuality, or any other social phenomenon into two coins, a female and a male coin. Each coin has two sides, heads and tails. Heads is always the female version of the social phenomenon. Tails is always the male version of the same phenomenon." With this approach, there are four perspectives that can be discerned. For example, in patriarchal society, where history is the history of men, an examination of an historical moment would include a men's version of the action of men, women's version of the action of men, men's version of what women were doing (wherever they were doing it), and finally, women's version of what women were doing" (Cavin 17-8). Most of Carson's biographers have been what Cavin might call male-identified and therefore preoccupied with the placement of men in her life.

4 For many gay, lesbian, bisexual and feminist activists, the incident at Stonewall signifies the most important milestone in the worldwide struggle for gay rights. There, for the first time on record, the predominantly lesbian and gay patrons fought back when the bar was raided by police officers, who came hoping to arrest homosexuals engaging in illegal sexual acts.

[5] Lear does not deny the possibility that Carson lived discretely as a lesbian; indeed, many of the passages from Witness for Nature I've included in this chapter are laden with innuendo of Carson's exclusive and loving attachment to women. Yet, because the content of Witness for Nature appears comprehensive, because she includes corrections for earlier biographies, and because of the close proximity Lear assumes to Carson's intimate life (as exemplified by her unacknowledged and intermittent references to Maria as "Mamma"), Lear's refusal to identify Carson as lesbian suggests serious denial and sadly, promotes an unfortunate trend that erases lesbian experience. On the other hand, she was able to publish her study.

[6] For example, Lear claims that biographer Frank Graham Jr. "is in error in suggesting that [E.B.] White's column influenced Carson" (WFN 546n16). Philip Sterling's juvenile biography Sea and Earth: The Life of Rachel Carson was based largely on interviews with Carson's brother, whose recollections Lear calls "inaccurate and suspect in both detail and motive" (WFN 491n28). Sterling included "an extended fictionalized conversation" between Carson and Elmer Higgins that Lear assumes is substantively accurate, but unfortunately, "his fictionalized encounter has become near legend, instead of Carson's own recollection" (WFN 504n1). Elsewhere, Lear exposes the near legendary story that Olga Huckins "had begged Carson to find someone in Washington to help stop the spraying" thus initiating Carson's interest in pesticides and confesses: "Here my intention is to correct Huckins' role in the origins of the book that became Silent Spring as reported by Paul Brooks, The House of Life: Rachel Carson at Work, and by Graham, Since Silent Spring, and repeated endlessly by others. (WFN 546n10). Another popular myth has Carson as the only woman to take the aquatic biology test and that she achieved the highest overall score. According to Lear, Carson may or may not have been the only women to make the test in May 1935, but she was first on the women's register and the fact that "the acting commissioner of the Bureau of Fisheries felt it necessary to write a special memorandum justifying the appointment of a female suggests that she was not the highest-scoring applicant" (WFN 504n3). Out of professional courtesy to earlier biographers, or perhaps because correcting the record is somewhat secondary to her purpose, most of the corrections and all of the criticism are located in end notes.

[7] Grace Croff was Carson's first mentor at Pennsylvania College for Women (PCW) and had a similarly powerful, although less enduring influence on Carson than Skinker. Croff was Carson's English composition instructor and college mentor at Pennsylvania College for Women and in addition to Skinker, she "greatly influenced [Carson's] future direction" (Bonta 263). Like Skinker, Croff was Carson's friend as well. They "spent time chatting after class, having tea, talking about literature, writing, music, and art" and when weather permitted, "they could often be seen on one of the many wooden benches that dotted the shady woodland campus, engrossed in conversation" (Lear, WFN 32). Carson was doubly crushed when both Skinker and Croft left PCW prior to her senior year (Lear, WFN 48).

[8] According to Lear, "Pioneering female scientists on the faculties of women's colleges guided the careers of their brightest students, ensuring their success and grooming their protégés to succeed them. Traditionally the teacher encouraged the student by becoming a mentor and close personal friend. Often the protégés joined the teacher on the same faculty, continuing the tradition" (WFN 45). I will return to this trend along with others related to the history of women in science in chapter five, "Science, Sisters, and the Sea: Rachel Carson and her Refusal to be Silent on Matters of Science in the Sea Books."

[9] Bonta claims Carson had a steady boyfriend during her college years (Bonta 263), but Lear's reference here is the only time she mentions a date. According to Lear, the young man who accompanied Carson to the junior prom "asked Rachel out at least once more that spring. In late April 1928 he drove down from Westminster [University] to PCW to see Rachel. There may have been other dates, but Rachel never mentions him again" (Lear, WFN 45).

[10] Obviously, I cannot recount these relationships in the detail contained in Lear's Witness for Nature, but in brief, during her years of government service, Carson was closest to Kay Howe and Shirley Briggs. They would take regular coffee breaks together and plan "their next naturalist outing or the weekend's social gathering" (Lear, WFN 124). If they weren't bird watching or hiking on weekends, Carson had Shirley and Kay over to play pinochle or they went to Shirley's or to Kay, sometimes joined by Kitty Birch or Kay's roommate (Lear, WFN 124-5). When they became friends, Howe and Briggs were both in their late twenties, ten years younger than Carson and just older than her nieces and according to Lear "While friendship, mutual admiration, and genuine affection developed between them, Rachel viewed Kay and Shirley as she might have two younger irrepressible sisters. They were enjoyable colleagues and devoted friends" (Lear, WFN 123). Carson remained fond of Howe, but their interaction would all but end after Howe left government service and married in 1950 (Lear, WFN 147). Briggs was a dear friend, a lifelong supporter, and following Carson's death, she and Ruth Scott would help to organize what became The Rachel Carson Trust for the Living Environment (Lear, WFN 483). Scott

was one of several close friends who shared Carson's political consciousness and her willingness to translate a moral commitment into action.

11 According to Lear, "Beverly Knecht had been an invalid since childhood. Stricken with polio and diabetes, she had been on the verge of success as an artist when acute glaucoma deprived her of her sight during her senior year of college" (WFN 353). Knecht turned to writing as an alternative way to express her creativity and had some success before additional complications related to her diabetes and a long period of writer's block brought her progress to an end. As a harbinger of the challenges Carson would face when her own health deteriorated and threatened her ability to write, Knecht first contacted Carson "serenely confident that she could write, but, ironically, too ill to sit at a typewriter" (Lear, WFN 353). For both, writing was a vehicle. an important means for communicating with others, and for escaping physical infirmities and other painful realities.

12 There are many examples of carnage and predator-prey relationships in the sea books. McCay finds "a tooth-and-claw element to the opening chapters of Under the Sea-Wind, but for Carson the cycles of predator and prey are part of a much grander cycle that is essentially harmonious. It is seeing the larger harmony that makes equanimity possible in the face of smaller violences" (27) and "Scomber is often saved only because his attackers are in turn attacked" (Gartner 30). In The Sea Around Us, Carson finds "the world of the continental slope, like that of the abyss" to be a "world of animals—a world of carnivores where each creature preys upon another" (60), although she is as likely to portray, non-violent examples of the food chain such as in The Edge of the Sea when she describes anemone "flowers" that sway over submerged stone fields spelling death for many beings of the sea as they draw minute spheres and ovals and crescents of protozoans, small algae, the smallest crustaceans and worms, and the larvae of mollusks and starfish in to ingest them (96). Indeed, though she does not deny the potential for violence, Carson claims to have "felt little awareness of this relentless predation on making a casual visit to the habit of the conchs. There are long periods of somnolence and repletion, and the grassy world by day seems a peaceful place" (TETS 237-8). These patterns have lead scholars to conclude that in spite of the sense that there is a place for everything in the sea, "Carson does not pretend that the sea is a peaceful domain" (McCay 25), although most often, "the overall effect is one not of brutality, but of harmony" (Raglon 202).

13 One of the most popular and visible patriarchal experts on lesbians during the last century was Dr. Frank Caprio whose many works on sexuality came to represent the most popular and became the most frequently cited examples of a sickness theory to describe lesbians. According to Adams, whenever Caprio addressed lesbianism, he revealed "a narrow, punitive, vision of the lesbian as antithesis of the passive, maternal, domestic, 'normal' woman" (Adams 266). Published first in 1954, his most damning and resilient study, Female Sexuality remained in print until 1972, a year prior to the American Psychiatric Association voted "to delete homosexuality from its list of mental illnesses" (Adams 266)

14 For Adams, "Insane, murderous siblings and incongruously sordid surroundings often accompany the lesbian presence in postwar mainstream fiction, and the lesbian character when she does appear is almost always "explained" psychoanalytically, with reference to her horrible parents, her traumatic youth, or abominable heterosexual experience" (Adams 268). Given these characterizations, it is understandable that Carson was reluctant to openly claim a lesbian identity.

15 According to Lear, Carson's gender prevented her from being promoted as fast as she might have been, although "she made steady progress upward in rank and grade" (WFN 97). She began writing radio scripts for the Bureau of Fisheries in 1936 (Lear, WFN 79). In 1939, a major bureaucratic reorganization resulted in the Bureau of Fisheries being assumed into the new U.S. Fish and Wildlife Service (Lear, WFN 95). Carson was promoted to an assistant aquatic biologist in 1942 and worked at that grade until 1943. After that, she worked as: an associate aquatic biologist from 1943-45; an aquatic biologist from 1945-46; an information specialist from 1946-49, and the Information Division's editor-in-chief from 1949 until 1952 when she left government service. (McCay 13-4). She earned every advancement, but was also "exceptionally lucky [to have had] supervisors who recognized her talents" (Lear, WFN 97). That Carson was the first woman to be hired by the Bureau of Fisheries, that she was lucky in her supervisors, and that she was an exceptional employee reflect a pattern typical of women who successfully negotiated government science during the first half of the twentieth century, as will be demonstrated in chapter five, "Science, Sisters, and the Sea: Rachel Carson and her Refusal to be Silent on Matters of Science in the Sea Books."

16 Of course, this is most evident following the publication of Silent Spring when "powerful forces sought to discredit Rachel as an oddball—unsociable, unathletic, unattractive to men" (Bonta 263). Prior to Silent Spring, Carson may have been a social anomaly, but she did not overtly threaten patriarchal institutions. Silent Spring made her visible as a target and some of the most appalling attacks came from agents of patriarchy who enlisted domesticity as a weapon against her such as Monsanto Corporation's "The Desolate Year," a parable parody of Silent Spring that ridiculed both Carson and her

science (Lear, WFN 431), the National Pest Control Association's nasty nursery rhyme "Rachel, Rachel," and a disturbing adaptation of the "Twelve Days of Christmas," entitled "Carsonoma Chorale" performed by the "Chlorinated Choir" (Lear, WFN 434-5). Criticism of this sort was not the sole purview of men. One of Carson's most visible and persistent opponents following the publication of Silent Spring was a woman. Chemical companies enlisted the assistance of Dr. Cynthia Westcott, an entomologist as their secret weapon (Lear, WFN 435). According to Lear, Westcott "was known to garden club women because of her popular column "The Plant Doctor," published in *American Woman* and syndicated in many influential women's magazines" and Westcott "made a careful distinction between herself as 'Dr.' Westcott, a scientist with a degree, and 'Miss' Carson" and "deliberately misstated Carson's positions, telling her readers that without pesticides the American housewife would find it difficult to feed her family and warned that 'unchecked' pests would bring 'starvation and death'" (WFN 436-7).

17 While I will discuss briefly trends during Carson's government career—which was indeed a career in science—I will deal explicitly with the history of women in science, the hegemonic and masculinist ideology of science, as well as Carson's place within those worlds in chapter five, "Science, Sisters, and the Sea: Rachel Carson and her Refusal to be Silent on Matters of Science in the Sea Books."

18 The Price of Salt was published by Highsmith under the pseudonym Claire Morgan and according to Adams, "generations of women have read it, have written the author thanking her for writing it, and various paperback houses and feminist presses have kept it in print more or less continuously for over thirty years" (Adams 257).

19 Rarely does Carson use metaphors of man-made origin, and when she does, the reasons or her choices are clear (as in the case of domestic metaphors). More metaphors of human creation are discussed in chapter five, although there is much more work to be done in this area.

20 Leopold's A Darker Ribbon: Breast Cancer, Women, and Their Doctors in the twentieth Century provides an historical context for understanding the relationship between Carson and her doctors, between breast cancer and others illnesses, and between the mid-twentieth century and now. While she acknowledges that Carson needed to protect her privacy, she is less clear on who and what she needed protection from. For example, she notes Carson's "unyielding sense of privacy, which valued a clear and unbridgeable separation between the public and the personal, can be hard for more modern sensibilities to grasp. Its clarity is perhaps emblematic of an earlier culture where social behavior was neatly compartmentalized, each chamber clearly defined and subject to its own set of rules" (121), yet Leopold does not distinguish between the rules and the rulemakers, nor does she specify who benefited from such compartmentalization. Even in the world Leopold imagines, Carson's situation would have been vulnerable without the protection of a father or husband to shield her from unseemly innuendo and scandal. While I believe that Leopold's analysis is well-meaning and caring, it demonstrates the kind of blind speculation and unexamined assumptions typical of scholars of Carson who survey only the surface of her story. Such an approach ultimately trivializes Carson's delicate social situation and underestimates the actual obstacles she faced. For example, Leopold quotes from a letter written to Freeman as follows: "The trouble with this business [of cancer] is that every perfectly ordinary little ailment looks like a hobgoblin, and one lives in a little private hell until the thing is examined and found to be nothing much" (Leopold 139). Later Leopold alters Carson's phrase to "a private little Hell" without acknowledging or perhaps unaware of the deprecation such a change accomplishes. Furthermore, Leopold echoes Lear when she relates that Carson underwent "sterilization" in 1961 as part of her treatment (134). Here Leopold uses a term that is both inaccurate and troubling (though certainly sanctioned by a misogynistic medical field) and is repeated by Lear in Witness for Nature. Later, Leopold clarifies what she meant by referring to sterilization as "the protective effect of the removal of her ovaries" (Leopold 138). Much more useful is her analysis for the medical culture and the evolution of breast cancer as a disease, as when she notes that "the rigid separation of public and private experience that is built into Carson's perspective on her illness is really an accurate reflection, at the individual level, of a much more pervasive pretense that operated across society at large" (Leopold 121).

21 Following the publication of The Sea Around Us, Briggs penned a humorous illustration in response to the image some readers and reviewers seemed to have of Carson, that of "a female of Amazonian proportions striding the seas, long hair tossing in the wind, an octopus in one hand, sea spear in the other" (Lear, WFN 207). The illustration amused Carson, but she also resented being assigned labels and stereotyped in public forums.

22 Susan Cavin advances a process similar to compulsory heterosexuality discussed by Rich and others, in Lesbian Origins when she explains: "The transition to patriarchy is made possible by the male heterosexualization of women. The sexual mode of patriarchy is the required heterosexual monogamy of the female. In order to straighten out the mass of women—lesbians, celibate women, spinsters, manhaters (Amazons), mother heads of households, and 'illegitimate' children... must be targeted by

straight men as examples of female sin, the acts of sick women, abnormal women, diseased women, insane women, dangerous women—and set up as outcasts, criminals, deviants, marginal examples of what fate befalls women who do not become heterosexually monogamous. Women refusing to practice heterosexual monogamy must be punished as examples to the rest of the female population." (Cavin 164-5)

23 The degree of Carson's desperation to spend time with Freeman might be measured by the fact that she eventually even approached her brother for help. She nervously arranged a meeting between them, and it was a risk that paid off when "even her hopelessly self-impressed brother was vulnerable to Dorothy Freeman's warmth and graciousness" and because "Robert's approval allowed Rachel to be more open about her friendship with Mrs. Freeman and gained her a begrudging measure of cooperation from Robert in caring for Mamma when Rachel went out of town" (Lear, WFN 269).

24 According to Lear, Stan was a really nice guy. The summer when the Freemans met the Carsons, "they had been married almost twenty-nine years" and were loving, affable, and devoted to each other (Lear, WFN 247). He accepted "the necessity of sharing his life and his home with his elderly mother-in-law, enjoyed his son's company, and delighted in his new baby granddaughter" (Lear, WFN 247). In some ways, Stan's constitution seems similar to Carson's father, although their circumstances were significantly different. Between Stan's kind eyes and ready smile (Lear, WFN 247) and accounts of the elder Robert Carson as "a quiet, kindly man" (Lear, WFN 12), they seem to have shared a similar approach to domestic life. Robert Carson had passively accepted Maria's ambition and influence over their family while, Stan acquiesced patiently before a proliferating relationship between his wife and Carson: "There is no evidence that he ever felt threatened by Rachel's love for his wife or hers for Rachel. It was, for him as for them, a friendship that was beyond definition or categorization, and Stan was wise enough to be happy about it, understanding it was in a realm unto itself" (Lear, WFN 264). Stan may have bested Carson's father, however when his keen "interest in photographing seashore life provided common ground" to establish his own relationship with Carson, independent of her relationship with Freeman and they corresponded "separately and fairly frequently" (Lear, WFN 264). Their friendship would deepen and Stan would become increasingly important to Carson—not simply because she used his photographs in her research and to illustrate her lectures (which she did), but because of his easy way with children. During summers in Maine, Stan frequently made special arrangements to include Roger in his summer outings, sometimes with his granddaughter, sometimes without, but always offering both positive role-modeling and companionship to a young boy and giving his mother and Carson time to work or rest (Lear, WFN 265). Baby Martha Freeman had been born earlier in the spring and would grow up cherishing her grandmother. Much later, she would edit and publish a collection of the letters between Freeman and Carson.

25 The former group was a milestone of sorts and explored the preciousness of their connection (Lear, WFN 255); the latter described "the singular romantic nature of their friendship" (Lear, WFN 253).

26 Lear documents many examples of Rodell censoring or destroying personal papers on Carson's behalf as well as the havoc wreaked by Carson's brother following her death. Less overtly, those such as Shirley Briggs, Paul Brooks and Carol Gartner who assert that Carson's life was her work and any biography produced should focus on her work actively participate in concealing and burying important details regarding some of the people, values, and issues Carson held most dear.

27 Regarding Carson's relationship with Skinker, Lear acknowledges that, "Because there are few surviving letters between Mary Scott Skinker and her most famous student, I can only suggest the nature and extent of their relationship. Even without written evidence, it is clear that their friendship was an intimate one" (WFN 497n59). Hynes speculates that "No doubt the destroyed letters of their early years, in which Carson and Freeman explored the why and how of a relationship that was so spontaneous, unexpected and intense, articulated more of the complexity of their feelings than those that remain. Nonetheless, the extant letters reveal that this was more than an intimate friendship between kindred spirits [. . .], without naming or specifying the nature of the 'more than.'" ("Together Forever" 16).

28 There were times when the four room farmhouse contained nine people including Carson's parents, brother Robert, his wife and child, Marian and her two toddlers, and of course Rachel. The Carson's lived there for twenty-nine years with neither central heating nor indoor plumbing (Lear, WFN 11). No wonder Carson escaped to the woods on "long hikes up into the familiar hills above the Allegheny. She read and wrote poetry and made the best of the situation at home" (Lear, WFN 34).

CHAPTER IV.

LIVING ON THE EDGE: LOCATING THE OTHER IN RACHEL CARSON'S THREE STUDIES OF SHORES AND SEAS

Rachel Carson was in love with the sea, and her love was deep and wide. Her three books about the sea were closest to her heart and represent most of her life's work. They won her fans and admirers, acclaim, and even modest celebrity. Therefore it is surprising and sad that scholarship on her work reflects neither depth nor breadth. In fact, there is very little critical analysis of the sea books, and the scholarship that does exist is fatally determined by analysis of Silent Spring. Rhetorical analysis has been popular among literary critics of Carson's work, and in some ways it is an obvious choice for Silent Spring because the book is highly polemic and didactic. Carson could be an incredibly persuasive writer and Silent Spring is an overt activist text. While there is continuity throughout the body of Carson's work, there are significant differences between Silent Spring and the sea books. The Edge of the Sea, The Sea Around Us, and Under the Sea-Wind are not organized as arguments and are not particularly controversial in content. Instead, they are comprised of interrelated threads of piquant narrative accounts based largely on patient, low impact investigation and actively inclusive observation.

Although feminists have established a sustained presence in the study and application of a broad range of rhetorics and contributed significantly to advancing its epistemologies, their traditions can be traced to the same logical frameworks that fortify Western ideologies of oppression and the institutions that perpetuate them. It is not possible, perhaps not even desirable to fully sever these ties.[1] Nevertheless, like the scientists I will discuss in chapter five, rhetoricians can never completely escape implication with patriarchy and the -isms. In the case of rhetorical analysis of Carson's

work, critics have been (at least provisionally) successful locating her within masculinist and hegemonic literary traditions, but they have also missed significant opportunities to investigate the ways in which Carson challenged those traditions, as well as to identify other traditions to which she belongs.

Thus, the state of scholarship on Carson is more moraine than morass and I find that feminism and finally ecofeminism provide useful analytical tools to bridge the gaps and fissures so that the critical landscape on Carson's work can become as coherent, congruent, and captivating as the landscapes she describes in the sea books. In this chapter, I utilize ecofeminist literary criticism in order to examine in detail how Carson's rendering of life in layers and zones offers readers a significant opportunity to reflect on the realities, implications, and consequences of a social world stratified by gender, race, class, sexual orientation, and other identity markers of difference. In addition, I will reflect on Carson's generous invitation to readers to increase their comprehension of both the natural and social worlds in demonstrations of shifting perspectives and attention to perceptions alternative to eye/I-sight.

Neither of the two most sweeping, substantial, and influential studies to date, Carol Gartner's and Mary McCay's books, both titled Rachel Carson, consider Carson's work with a feminist lens. There are shorter pieces that include references to the sea books that do, including Vera Norwood's chapter, "Nature's Advocates: Rachel Carson and Her Colleagues" which appears in her study, Made from this Earth: American Women and Nature and Rebecca Raglon's "Rachel Carson and Her Legacy" in Natural Eloquence: Women Reinscribe Science. Both essays provide a critical assessment of Carson's work by positioning it within a social and cultural context, although neither of them offers (or to be fair, neither professes to offer) specifically literary analysis. Both recognize gender as an important component in the construction of those contexts. Norwood includes some attention to matters of class (although not specifically in regard

to Carson's class position), and neither she nor Raglon mention Carson's experience as a lesbian.

Gartner's work is literary analysis with some biographical detail, whereas McCay's is a biography that includes broad literary analysis. Gartner's work was published in 1983, ten years prior to McCay's and to varying degrees, it informed McCay's reading of Carson's writing as well as Linda Lear's discussions of the sea books in Witness For Nature.[2] Despite differences in methodology and purpose, there are several striking similarities in the approaches taken and conclusions reached by Gartner and McCay. Both read Carson's work as chronologically cumulative and as indicating the evolution of her environmental consciousness, and both argue for Carson's inclusion in various literary canons. Gartner focuses on rhetorical strategies and patterns in narratives because according to her, it was these qualities in Carson's writing that persuaded readers "to accept her radical premises" (2); however, except in regards to Silent Spring, Gartner is not clear what those radical premises might be. McCay's approach is less attached to identifying specific rhetorical and narrative strategies than Gartner's, highlighting instead passages that demonstrate Carson's ecological philosophy and more general examples of cyclic movement and interconnection in Carson's writing.

For Gartner, Carson was a gifted writer whose work reflected "surety and finesse" and fulfilled "all the demands of classic realistic writing" as defined by Henry James and William Dean Howells (45).[3] In addition, Gartner claims that along with Henry David Thoreau and later writers "such as critic Joseph Wood Krutch and humorist E. B. White, Carson, in both method and ideas, belongs not only to the line of nature literature, but also to the broader literary tradition" (127). Similarly, McCay asserts that all of Carson's published works "belong in and expand and enrich the tradition of (U.S.) American nature writers" (99). According to McCay,

> The combination of a child's sense of wonder that never deserted her and an abiding sense of responsibility are at the core of Carson's writing. That twofold focus links Carson to a tradition of American nature writers who saw it as the writer's responsibility to interpret nature for others in order to preserve and protect it. (85)

McCay devotes an entire chapter to locating Carson within what she calls the "Naturalist Tradition," comparing her favorably with Thoreau, Ralph Waldo Emerson, William Bartram, John Muir, Aldo Leopold, and Henry Beston as well as writers that came after her. Indeed, McCay argues that while many of the themes that occur again and again in Carson's writing, including "[t]he cycles of the seasons, the interdependence of all elements of the natural world, the sense of endurance, continuity, and immortality all intermingle" in these writers, they reach a "poetic crescendo" in her work (McCay 99). For me, the twofold focus McCay describes in the extended excerpt above are the motivations behind Carson's critiques of ideologies of oppression that will be discussed in this chapter (as well as the next). In addition, this mingling of wonder with the optimism, openness, and hopefulness combined with her commitment to action may have inspired her to propose the sometimes radical critiques and alternative models suggested throughout this study.

While neither Gartner nor McCay identify themselves as feminist or acknowledge the relevance and value of feminist inquiry, their studies reflect early second wave feminist exhortation to recover and reclaim misconstrued, forgotten, or buried works by women. A lack of feminist commitment does not spare either study from winding up in a conundrum similar to that faced by early second wave feminist scholars, who found that positioning women within masculinist traditions and patriarchal histories limited their ability to critique the institutions and ideologies that fostered women's exclusion in the first place. After ardently arguing for Carson's inclusion in the incredibly masculinist

dominion of early American nature writers, their attempts to distinguish her from that tradition are unsuccessful. For example, McCay claims that Carson was unique because of her sense of humility: that she never insisted on "her centrality in the natural world," and never felt as though "nature was there for her personal use" (85). Furthermore, unlike the nature writers that came before her, Carson did not "use nature to preach, to make political statements, or to reflect on her own inner reality" (McCay 86). Gartner also argues that Carson's work extends the generic range of nature writing. She explains:

> Thoreau is credited with making the nature essay a literary form. Rachel Carson has done the same for the science book. Her work is not yet recognized as the beginning of a new literary tradition, but its influence may already have affected the best recent science books for the general public. (Gartner 135-6)

Despite her reference to innovation and a new beginning, Gartner simply transfers Carson's cachet from grounding in literary to scientific traditions. Gartner does not imagine Carson outside masculinist traditions, but McCay makes an important if brief, final observation in the last pages of her book. She asserts that Carson did not identify herself as a feminist, "but her ideas about the connectedness of the natural world and her sense that a violation of one part of it influences the whole has been embraced by ecofeminists" (McCay 106).[4] What McCay misses is how much ecofeminism and ecofeminist literary criticism have to offer to the analysis of Carson's work in general and the sea books in particular.[5]

First, I should explain that ecofeminist literary criticism is one branch of ecofeminism;[6] it emerged in the 1990s and has grown significantly since (Gaard and Murphy 5).[7] In her article in the anthology, Ecofeminism: Women, Culture, Nature, Gretchen Legler defines ecofeminist literary criticism as a hybrid criticism that combines

ecological or environmental criticism with feminist literary analysis in order to provide a unique and powerful perspective for critics to draw from as they "investigate the ways nature is represented in literature and the ways representations of nature are linked with representations of gender, race, class, and sexuality" (227). Barbara Gates also acknowledges that diverse backgrounds have merged and grown in ecofeminism, although she reaches beyond uncomplicated parallels between women and nature in her assessment of its aims. Informed by the work of Françoise d'Eaubonne and Janis Birkeland, Gates claims that among the beliefs shared by ecofeminists are:

> the necessity for social transformation by moving beyond power politics and an equivalent necessity for less "management" of the land [. . .] an appreciation of the intrinsic value of everything in nature—a biocentric rather than anthropocentric viewpoint; an end to dualisms like male/female, thought/action, and spiritual/natural; and a trust in process, not just product. (21)

Many of the assertions I have made about Carson's work throughout this project demonstrate similar sympathies and convictions: the ethic of caring she expressed toward the natural world, instilled by her mother and communicated through the sea books set forth in chapter two; her dedicated attention to connections, communities and interdependence as discussed in chapter three; her studied habit of combining unlikely pairings in descriptions that upset traditional notions of gender difference discussed earlier in this chapter. In addition, for many ecofeminist literary critics, writers who promote strategies that encourage readers to relate to the natural world as populated with knowable subjects rather than renewable/disposable resources, are activists. As I will demonstrate shortly, Carson utilizes a variety of strategies to encourage readers to alter their relationship with the natural world and non-human nature. But there is more.[8]

The sea books are saturated with ambiguity and demonstrate immersion in the margins on every level. The titles of the sea books speak of borders and suggest the obsession contained between the covers. The Edge of the Sea opens with a chapter called, "The Marginal World" and in the pages that follow depictions abound of borders, sometimes gentle, sometimes violent, and border life, rich and vibrant with dwellers of indeterminate character, and transients, interlopers, and other border crossers. The Edge of the Sea is the book that brought me to Carson and inspired the direction and much of the discussion in this chapter, although Carson's centering of marginal worlds, her studied insistence on privileging the perspective of the "other," and her detailed depictions of borders and border life are evident in all of her work. Even in early and occasional writings, Carson frequently focused on marginal creatures or on marginal environments. For example, while writing for a primarily mid-Atlantic readership, Carson highlighted regional habitats such as the Chesapeake Bay, and introduced consumers to lesser known, less commercially exploited local species of fish. She admired the successful proto-scientific commissioning of radar and the aeronautical prowess of the first mammals to fly in her article, "The Bat Knew it First," and sought to rehabilitate the starling's reputation as an invasive, non-native/immigrant species in her essays "Housing of Starlings Baltimore's Perennial Problem" and "How About Citizenship Papers for the Starling?" (Lear, WFN 93).[9] Gartner addresses Carson's attention to borders, and claims that the border zone, "where sea meets land, where life emerged from the sea in the course of its leisurely evolution" is where Carson makes the reader "realize that human beings are no longer of central importance" (Gartner 69).[10] For me, there is so much more.

For Carson, the "shore has a dual nature," where on one day "a little more land may belong to the sea, tomorrow a little less," and that "always, the edge of the sea remains an elusive and indefinable boundary" (TETS 1). Dualities soon blend and

merge and boundaries between them become so blurry that subjects, whether landscape or life form, become indistinguishable from one another. On the night of the flood tide in Under the Sea-Wind, both "water and sand were the color of steel overlaid with the sheen of silver, so that it was hard to say where water ended and land began" (3). Blurring boundaries results in the ambiguities between individuals and communities like those discussed in the previous chapter, but they also signal reconciliation of separation caused by difference. For example, the "black inscription" of microplants written on the shore is "the sign of the meeting of land and sea" and it is a sign that is "the same all over the world—from South Africa to Norway and from the Aleutians to Australia" (TETS 47). Despite the appearance of unfathomable difference and the illusion of complete separation, Carson describes the unifying affect of the sea in The Sea Around Us:

> There is [. . .] no water that is wholly of the Pacific, or wholly of the Atlantic, or of the Indian or the Antarctic. The surf that we find exhilarating at Virginia Beach or at La Jolla today may have lapped at the base of Antarctic icebergs or sparkled in the Mediterranean sun, years ago, before it moved through dark and unseen waterways to the place we find it now. (147)

There are political undertones in Carson's sea books, suggested in her engagement of borders and border crossing and her regular reliance on fluidity over rigidity in characterizations and descriptions of beings and landscapes. Carson's world was circumscribed by social restrictions and diminished expectations, yet in the sea books, she provided radical critiques of patriarchal social order using metaphors and narrative strategies that anticipated those that would be claimed by feminist and other progressive social activists a generation later.

Borders and border crossing resonate powerfully for feminists, ecofeminists, and others in progressive movements.[11] According to Susan Stanford Friedman in the introduction to her study, Mappings: Feminism and the Cultural Geographies of Encounter, whether literal or figurative, material or symbolic, border talk is everywhere these days (3). Gloria Anzaldúa's 1987 collection, Borderlands/La Frontera: The New Mestiza, was among the first and most eloquent to explore the theoretical implications of actual borders, border crossing, and border culture and to suggest the potential of border metaphors to re-imagine identity and representation. Indeed, Borderlands/La Frontera has attained "theoretical status" and has become one of the most influential and frequently cited texts "among a wide range of multicultural, postcolonial, cultural, feminist, and gay/lesbian/queer scholars and activists" (Friedman 93). For Anzaldúa, the border is a real place with geopolitical implications, although she invokes imagery similar to Carson's when she chooses the edge of the sea as a metaphor in the poem that opens the work:

> Wind tugging at my sleeve
> feet sinking into the sand
> I stand at the edge where earth touches ocean
> where the two overlap
> a gentle coming together
> at other times and places a violent clash. (Anzaldúa 1)

Anzaldúa describes the shore as representing two conflicting and opposing forces, like two irreconcilable nations, that come together as one. The location of their unrest has something of each of its contributing elements, and it has its own unique identity as well. For Anzaldúa, it is a fleeting association, although one with a resounding impact.[12]

Similarly resounding has been the impact of border studies on feminist theory, feminist literary criticism, and ecofeminist literary criticism. I have no hope of covering

the vast scope of this contact and interaction, although I will trace some of the themes most relevant for uncloaking the political and ideological implications of Carson's depiction of the natural world in the sea books. To begin with, feminist engagements with borders have made possible discussions of identity that account for predictable patterns in the distribution of social power and resources. Borders also make visible descriptions of identity in terms of dualisms of what is/is not. For Friedman, identity in a Western sense is "unthinkable without some sort of imagined or literal boundary" (3). According to Val Plumwood in her study, Feminism and the Mastery of Nature, the division into dualisms is neither neutral nor arbitrary, but the result of a process "by which contrasting concepts [. . .] are formed by domination and subordination and constructed as oppositional and exclusive" (31). Among the contrasting pairs that are key elements in the dualistic structure of Western ideology are: culture/nature, male/female, mind/body, reason/emotion, human/nature (non-human), production/reproduction (nature), public/private, subject/object, self/other (Plumwood 43). Thus, the qualities (actual or supposed) associated with the condition of being a man (for example) are culturally construed as superior, whereas the condition of being a woman is understood as inferior.[13]

Though many years would pass between the publication of the sea books and the days when second wave feminists would describe dualisms as undergirding patriarchy and other systems of oppression, there is surprising evidence that Carson was sensitive to binary divisions, particularly in terms of gender, signaled by her invocation of items associated with the domestic realm.[14] While Carson prefers to describe the natural world with references to the natural world, she periodically breaks with that pattern by utilizing domestic metaphors.[15] Carson uses such metaphors to challenge hierarchically arranged social systems based on difference by upsetting the binary pairings that constitute identity. For example, Carson combines disparate

qualities in her description of "the delicately sculptured shells of mollusks called angel wings" when she explains they seem as "fragile as china" but nevertheless are able to penetrate clay or rock (TETS 18). Here, Carson joins traditionally womanly attributes (delicacy, fragility) with traditionally manly traits (strength, grit). Similar pairings occur throughout the sea books, leading Raglon to claim that it is "in small creatures such as the Convoluta that Carson was most apt to find the symbols she needed to express the dual strands of fragility and strength making up the complexity of the world" (Raglon 201). However, it is important to note that these strands are not equivalent. Many of these beings *seem* fragile, and *appear* delicate, but they are strong and resilient. Carson's rendering of a hydroid colony reverberates with additional implications:

> The whole was the very embodiment of beauty and fragility, and as I lay beside the pool and my lens brought the hydroids into clearer view they seemed to me to look like nothing so much as the finest cut glass—perhaps the individual segments of an intricately wrought chandelier. (TETS 116)

Carson observes the scene with the aid of a magnifying glass, which is crafted using the same technology that produces a fine chandelier, thereby linking the public world of scientists and technicians with the private world of domestic spaces. Finally, despite multiple allusions to clarity and transparency—in the pool, the lens, the clearer view and cut glass—Carson's inclusion of a chandelier imbues the entire scene with prismatic flashes of intense color. This vibrant alternative further undermines the system that relies on binary opposition that seems "obvious" within the framework of the ideologies that promote them.

Carson's use of domestic metaphors shows engagement of border crossing on other levels, as well. She refers to the dark glistening bodies of anemones tucked into rock burrows as raisins embedded in a cake (TETS 187), and an Angler Fish is "like a

great, misshapen bellows" (UTSW 248). Sometimes, these metaphors provide a point of reference for readers to translate their experience into imagining unknown habitats and unfamiliar inhabitants. The large red jellyfish Cyanea grows "from the size of a thimble to that of an umbrella" (TSAU 32) and when Scomber the mackerel came into being, he was "no larger than a poppy seed drifting in the surface layers of pale-green water" (UTSW 116). Although tiny, he was not alone because "life is scattered almost everywhere through the surface waters like a fine dust" (TSAU 18). Using metaphors that inspire cozy familiarity, Carson invites readers confined to domestic spaces because of their gender or their vocation to cross the threshold from that world into the world of nature.

For feminists, such crossings are significant. Deliberately invoking the homespun enables women writers to harness their "traditional talent for bridging home and community, private and public spheres, the artistic and the functional" and "talk about how women move beyond the borders of their own experience, closely connecting writer to reader, speaker to hearer" (D. Freedman 39). Norwood has commented similarly on Carson's use of domestic metaphors—in Silent Spring mostly, but in the sea books as well. She argues that these references reflect changes in the American household and deny separation between individual home places and the environment (Norwood 152). Whether erasing boundaries between public and private spaces or inviting transgression of those boundaries, such narrative strategies may well create new discursive possibilities as well as new opportunities in the world (D. Freedman 39). In other words, such metaphors emerge from marginal existence and encourage women and others along the margins to access heretofore inaccessible spaces such as the natural world or the public world of science.[16] In addition, integrating domestic metaphors in the communication of scientific information connects Carson to a tradition of women who have harnessed issues relegated to their gender as platforms to access

social discourse and influence public policy, a trend I will return to in chapter five, "Science, Sisters, and the Sea: Rachel Carson and her Refusal to be Silent on Matters of Science in the Sea Books."

Because women who have successfully accessed public discourses in the past were often required to downplay gender difference in order to participate in cultures and institutions that otherwise denied them, appropriation as a means to challenge the ideological underpinnings of dominance has been a useful strategy. This has been particularly true for women in science.[17] Dualisms have held much currency in feminist critiques of ideologies of oppression, as well as ecofeminist criticism of environmental policies that privilege dominant perspectives. However, critical engagements with binaries are trammeled in the end by the same parameters as the dyads they take on. To illustrate, Anzaldúa uses border imagery to successfully expose social systems based on binary opposition, but she does not submit to the authority of such systems, personally or politically, because to do so "locks one into a duel of oppressor and oppressed" (78). When Anzaldúa speaks of herself as being "both male and female," she states: "half and halfs are not suffering from a confusion of sexual identity, or even from a confusion of gender. What we are suffering from is an absolute despot duality that says we are able to be only one or the other" (Anzaldúa 19). Similarly, Trinh T. Minh-Ha explains the problem with binaries for women in or subject to Western cultures more generally when she writes,

> In the realm of dualities [. . .] [woman] finds no place she can simply dwell in or transgress. Crisscrossing more than one occupied territory at a time, she remains perforce inappropriate/d—both inside and outside her own social positioning. (4)

Metaphors of borders can accommodate more ambiguity than dualisms. In addition to joining and separating, borders "specify the liminal space in between, the interstitial site

of interaction, interconnection, and exchange. [. . .] They also invite transgression, dissolutions, reconciliation, and mixing" (Friedman 3). Feminist theories of identity have profited and proliferated from the addition of these concepts to the vocabulary of border talk.

According to Friedman, the continued relevancy of Borderlands/La Frontera "across the disciplines is not for its articulation of difference but rather for its complication of difference" (93). In a move to overthrow the system of binaries Anzaldúa proposes a powerful alternative in her conception of "mestiza," a hybrid who emerges from border cultures "where the Third World grates against the first and bleeds. And before a scab can form it hemorrhages again, the life blood of two worlds merging to form a third country" (Anzaldúa 3). For some, the power of the mestiza is that she is a "cultural subject who forges political unity by dissolving the international divide from both the social imagination and political practice" (Wright 209). More recent feminists have suggested that identities are fluid and shifting, comprised of "narratives of formation, sequences moving through space and time as they undergo development, evolution, and revolutions" (Friedman 8). For Trinh, a suitable description of identity is as a "trajectory across variable praxes of difference," where woman's "(un)location is necessarily the shifting and contextual interval between arrested boundaries" (4). Theories of identity have thus shifted from the binaries of patriarchy and other systems of oppression to border crossing and the blurring or erasure of boundaries to more recent images of identity that are shifting and fluid. Carson's subversive pairings of gendered characteristics and her blurring of distinctions between private and public spaces is radical, but for her as for many of the feminists that would follow her, submission to an ideological or political system based on binaries was less interesting than exploring alternative systems and imagining other possibilities.

That aspects of Carson's identity may have informed her portrayal of the natural world makes her writing of interest to ecofeminist literary critics concerned with how gender, race, class, and sexuality (among other identity markers) shape human relationships with nature. Although little in-depth work has been done in this area, many have at least identified Carson with the attitudes and convictions that have come to be associated with ecofeminism. Perhaps it was H. Patricia Hynes who first made the connection between Carson and ecofeminism that would later be echoed by McCay. In The Recurring Silent Spring, Hynes suggests that Carson's work informed many of the movements that coalesce in ecofeminism (46). She states decisively:

> For women making the connection between the masculinist ravaging of nature and the rape of women, Carson was a forerunner. She saw the problem for nature: the arrogance of men who conceive of nature for their own use and convenience. We see it for women: a similar arrogance which assumes that women exist for the use and convenience of men. (55)

Similarly, in her study on feminism and ecology, Mary Mellors sounds like McCay when she claims that "[a]lthough Carson did not articulate an explicitly feminist or ecofeminist perspective, her critique of scientific approaches to the natural world presaged later ecofeminist critiques" (15). Carolyn Gage claims judiciously that Carson was perhaps the first ecofeminist (10) and Noël Sturgeon asserts that Carson was "a natural scientist who was not explicitly feminist" although she can be identified as an ecofeminist foremother because of Silent Spring, "which arguably initiated the first nonconservationist environmental movement in the United States" (273n4). In addition, Sturgeon compiles a useful, if partial list of works that exemplify ecofeminist principles and interests which, in addition to works by Carson, includes works by Donna Haraway, Mary Daly, Alice Walker, Starhawk, and Vandana Shiva (261). Other writers include

Ynestra King, Carolyn Merchant, Annette Kolodny, Susan Griffin, Judith Plant, and Winona LaDuke as well as many of the scholars cited in this chapter. As important as associations between Carson and ecofeminism are, they suggest only an inchoate critical process. For Patrick Murphy in "'The Women are Speaking:' Contemporary Literature as Theoretical Critique," while "recovery of works by women demonstrating ecological sensibilities and proto-ecofeminst and ecofeminist themes has been, and continues to be, given high priority," there has emerged "intense debate about the degrees to which some of these recovered authors—Rachel Carson, Willa Cather, and Charlotte Perkins Gilman—are feminist or ecological or ecological feminist" (45). For literary scholars, the only way to affirm these assertions about the author is to turn to an interpretation of her writing.

Ecofeminist literary critics such as Karla Armbruster have borrowed from theorists grappling with ideologies and mechanisms of oppression such as feminism and poststructuralism, so they might learn to look at the ways a text conveys subjectivity as "socially and discursively constructed, multiply organized, and constantly shifting" as well as the ways a text can avoid "reinscribing dualism and hierarchical notions of difference" (106). Indeed, for ecofeminists such as Legler, reimagining what nature is and what kinds of relationships can exist can contribute to "the elimination of institutionalized oppression on the basis of gender, race, class, and sexual preference and part of what may aid in changing abusive environmental practices" (228). Finally, both Murphy and Patricia Yaeger suggest that strategies that identify the ways in which literature of the environment challenge hegemonic constructions of nature or human relationships with nature are in many ways "emancipatory strategies," offering real opportunities to change the way humans relate to the rest of the natural world as well as to each other (Legler 230). Carson's descriptions of borders, border life, and border crossers demonstrate powerful, pre-feminist privileging of difference as do her earliest critiques of patriarchal

ideology and social structures. Because she found her subject in the natural world and because she ultimately modeled alternative strategies to engage nature, ecofeminist literary criticism offers strategies of engagement most capable of revealing the political and ideological implications contained within the sea books.

The sea books are imbricated with an incredibly complicated network of absolute specificity and extreme ambiguity in the demarcation of borders and zones. The edge of the sea, shores, and other marginal environments are indeterminate, equivocal zones for Carson, but there are other areas clearly discernable by difference. Of the geographic provinces of the ocean—the continental shelves, the continental slopes, and the floor of the deep sea—Carson claims that each "is as different from the others as an arctic tundra from a range of the Rocky Mountains" (TSAU 58-9). Later, she explains that the foundations of the continents are separated by bands of colored mud:

> in the deep waters off the borders of the continental slopes, are the muds of terrestrial origin. There are muds of many colors—blue, green, red, black, and white—apparently varying with climatic changes as well as with the dominant soils and rocks of the lands of their origin. (TSAU 80)

On the way to her own stretch of shore in Maine, Carson differentiates land from sea by the color of the rocks beneath the forest's edge. Rocks that belong to the land are not only dry, but white or gray or buff (TETS 46). The place where the continent ends and the true sea begins between the Chesapeake Capes and Cape Cod is marked not by the distance from shore, but by a significant drop in the depth of water (UTSW 109). Detectable to human senses or not, changes "from zone to zone may be abrupt. It may come upon us unseen, as [a] ship at night crosses an invisible boundary line" (TSAU 20). Elsewhere, along the rocky coasts and below the last clumps of Irish moss, Carson describes the new sea bottom that is exposed "[a]s though a line had been drawn, suddenly there is no more moss, and one steps from the yielding brown cushion onto a

surface that seemingly is of stone" (TETS 106). Transitions may be extreme in addition to abrupt. For example, trawls descending through hundreds of fathoms of water pass "from ice and sleet and heaving sea and screaming wind to a place of warmth and quiet, where fish herds [browse in] blue twilight, on the edge of the deep sea" (UTSW 254). To this topography, Carson integrates communities that are similarly stratified in layers.

Carson's broad descriptions of borders and zones serve as an organized backdrop to be occupied by social systems and interactions. In Under the Sea-Wind Carson observes that sea creatures "are often assorted in layers, one above another" (138) and in the mossy turf of the tide zone, "life exists in layers, one above another; life exists on other life, or within it, or under it, or above it" (TETS 95). In deeper waters, Carson describes existence in stacked levels:

> The young eels lived in one layer or tier of a whole series of horizontal communities that lay one below the other, from the nereid worms that spun their strands of silk from frond to frond of the brown sargassum weed floating on the surface to the sea spiders and prawns that crawled precariously over the deep and yielding oozes of the floor of the abyss. (UTSW 260)

These layers not only support Carson's conception of interrelated communities and bioregions, but they also suggest her sensitivity to social patterns of division and inclusion, access and denial. Acknowledgement of layers allows Carson opportunities to explore the complexities, peculiarities, and implications of lives lived in layers and zones. In a chapter called, "The Pattern of the Surface," Carson notes that "[u]nmarked and trackless though it may seem to us, the surface of the ocean is divided into definite zones, and the pattern of the surface water controls the distribution of its life" (TSAU 20). Of the low water line along the coast of Maine during the lowest spring tides, Carson asserts that "although little else lives openly in this zone, thousands of sea urchins do"

(TETS 108). Later, she ponders the perplexing patterns exhibited by urchins in more detail:

> For some inscrutable reason, these rock-boring urchins and related species in other parts of the world are bound to this particular tidal level, linked to it precisely and mysteriously by invisible ties that prevent their wandering farther out over the reef flat, although other species of urchins are abundant there. (TETS 214)

The movement of some individuals can be impacted by seemingly inexplicable, mysterious, and sometimes invisible boundaries like those that prevent these urchins from wandering out of the zone they are born. These social restrictions are folded into naturalized explanations of differences between genders, races, classes, and others that may be less apparent.

The delineation of boundaries makes possible their crossing, and the sea books brim with endless reflections on negotiations, interactions, and traversing of borders and a persistent privileging of the perspective of border crossers. For example, in The Sea Around Us Carson notes that "the boundary between water masses of different temperatures or salinities is often a barrier that may not be passed by living creatures" (130) and as temperatures drop during the change of seasons, increasing cold can be like "a wall moving through the sea across the coastal plane. It [is] nothing that could be seen or touched; yet it [is] so real a barrier that no fish [can] run back through it any more than if it [was as] solid as stone" (UTSW 252). Carson finds from time to time scores of mullet leaping out of the water, "bursting through the surface film of the fish's world and falling back again like raindrops—first denting, then piercing the tough skin between air and water" (UTSW 95). Borders can be inconstant and access might be temporary, discriminating, or intermittent. In a cave along the coast and through "the same openings that admit light, fish come in from the sea, explore the green hall, and

depart again into the vaster waters" (TETS 118), but sand dollars or keyhole urchins pass "with effortless ease from the world of sunlight and water" to dim regions of which her own (human) senses knew nothing (TETS 138). Here, although she inserts herself into the narrative, the perspective she privileges with access is the sea creature that crosses borders.

Indeed, Carson is drawn to border crossers again and again. She lists many living beings that cross borders as part of essential daily activities or required as a phase in their life cycles. In Under the Sea-Wind she describes the youngest generation of shrimp passing elder generations between the sound and the sea on each flood tide during an annual exchange at the end of every summer (80). While some living things are confined to live out their days in the zones they were born to, others pass with regularity and virtual impunity through borders and layers. In The Sea Around Us, Carson elaborates:

> the real miracle of sea life in relation to great pressure is not the animal that lives its whole life on the bottom, bearing a pressure of five or six tons, but those that regularly move up and down through hundreds or thousands of feet of vertical change. (49)

Carson cites simple creatures such as small shrimp and other planktonic creatures as important examples of those capable of sustaining tremendous changes in water depth as they travel from surface to ocean floor. Similarly, she refers to the "ubiquitous common periwinkles" which are "in some curious way unaffected by the conditions that confine most intertidal animals to certain zones" and prosper "above, within, and below the moss zone" (TETS 97). Carson includes stories of interlopers, like the petrels that traverse the passage below and like terns that hesitate to alight on water for "while they take their living from the sea, they are not truly of it" (UTSW 183). Then, there are

examples of almost arbitrary containment. Recalling a research excursion aboard the *Albatross III*, Carson writes,

> There was never less than a hundred miles of cold Atlantic water between us and the Gulf Stream, but the winds blew persistently from the south and the warm breath of the Stream rolled over the Bank. The combination of warm air and cold water spelled unending fog. Day after day the *Albatross* moved in a small circular room, whose walls were soft gray curtains and whose floor had a glassy smoothness. Sometimes a petrel flew, with swallow-like flutterings, across this room, entering and leaving it by passing through walls as if by sorcery. (TSAU 131)

Whether arbitrary or by design, borders that regulate and determine access are a reality of living in the world for Carson. That there may be implications for individuals in (Western) societies is suggested by the circular room, the soft gray walls and glass floor which are of human invention, not sortilege.

That living in layers in the natural world might reflect realities similar to those living in a world stratified by gender, race, class, sexual orientation, and other social prescriptions can be seen most clearly in the sea books in depictions of creatures confined to zones and descriptions of terrifying consequences for transgression. For example, fish alarmed by predators from below may dash to the surface and leap through the "strange element beyond," but in so doing, they may be seized by hovering gulls (UTSW 133). Similarly grim, after a day of fishing, "bodies of the young fish—too small to sell, too small to eat—litter the beach above the water line, the life oozing from them for want of means to cross a few yards of dry sand and return to the sea" (UTSW 103-04). While some have read this scene as evidence of an early critique of human abuse in the natural world, the statement is passive and lacks an agent.[18] Moreover, Carson observes a similar holocaust in bodies laid out in beach flotsam where "strays

from the surface waters of the open ocean, [are] reminders of the fact that most sea creatures are prisoners of the particular water masses they inhabit" (TETS 164-5). For me, these passages reveal a deep attentiveness on Carson's part to the broad as well as specific consequences of transgression. These are lessons of importance for all members of human society: for those restricted to zones, for those who cross borders, as well as for those who keep them. Carson is careful not to alienate any of her readers, although as we shall see, she may have directed at least some of her instructive observations to particular audiences at times.

The threat of sanction and violence was real for people who overstepped social boundaries in Carson's time—as well as in ours. Therefore, acknowledging the parallel between the potential for penalties of unauthorized access, whether in the natural world or (Western) human social systems, is almost unavoidable. This is particularly true because in many of these examples, Carson orients readers for an emotional response by referring to human conventions of incarceration. For Legler, writers who erase or blur boundaries between "inner (emotional, psychological, personal) and other (geographic) landscapes" encourage readers to erase or blur "self-other (human/non-human, I/Thou) distinctions" (Legler 230). Blurring such distinctions further, Carson transforms the inhabitants of a particularly bleak and oppressive zone in a most fascinating manner:

> For most creatures, groping their way endlessly through [the] black waters [of the abyss], it must be a place of hunger, where food is scarce and hard to find, a shelterless place where there is no sanctuary from ever-present enemies, where one can only move on and on, from birth to death, through the darkness, confined as in a prison to his own particular layer of the sea. (TSAU 39)

This passage begins with the perspective of the other in the form of non-human nature, before shifting to a more intimate, "one." While "one" can be understood ambiguously as either I/Thou, the final "he" cannot.

Similarly and with less ambiguity, Carson explains that fishes of the deep sea "may sometimes wander out of the zone to which they are adjusted and find themselves unable to return" (TSAU 49). In painfully slow, blow-by-blow bursts, she describes how a fish roaming from layer to layer as it feeds might accidentally travel beyond an invisible, inviolable boundary:

> In the lessened pressure of [. . .] upper waters the gas enclosed within the air bladder expands. The fish becomes lighter and more buoyant. Perhaps he tries to fight his way down again, opposing the upward lift with all the powers of his muscles. If he does not succeed, he "falls" to the surface, injured and dying, for the abrupt release of pressure from *without causes distention and rupture of* tissues. (TSAU 49)

The image of a fish falling upwards is a disorienting reversal. However, Carson does not obfuscate the significant shift from a general "they" to a particular "he." She includes everyone initially, but then assigns male sex to the fish, thereby directing her address to those in human societies who identify with the corresponding gender.[19] The obvious explanation is that until relatively recently, "he" was not only grammatically correct, but accepted as gender-neutral. However, there are other examples of such shifts and I believe there are times when they suggest Carson's awareness of the complex layering of gender oppression. This position is buttressed by the fact that most of these exchanges are gender neutral or ambiguous. In her essay on ecofeminist literary criticism, Josephine Donovan suggests that strategies that encourage identification with the "other" provide readers the substance for an important awakening. For Donovan,

> [i]t is not a matter of making the dominated sensitive to the realities of the dominator, which she generally knows all too well. But most humans, even those who are themselves dominated because of gender or race, are dominators/exploiters of animals and other natural entities. (92-3).

In addition, confronting readers with borders reminds them, particularly those who enjoy greater as opposed to fewer social privileges that "they/I do not know, cannot have, everything" (D. Freedman 53) and a shift from general to particular asks readers with greater proximity to the privileges accorded men in Western, patriarchal society to imagine what it feels like to suffer the slings apportioned the "other." Thus Carson uses shifts between subject positions generally to invite readers to reconstitute the "other" as a subject and sensitize "dominators to the realities of the dominated" (Donovan 92). There are times when Carson seems to direct her allegories towards specific audiences, but mostly her comments remain general and broadly available.

Given what I have just said, it may seem a surprise that not all allusions to arresting captivity are portrayed as punitive in the sea books. Some, particularly those described as discrete exchanges between beings rather than generalized conditions of existence, suggest an uneasy ambivalence. The relationship between the cardinal fish and the queen conch (mentioned in chapter three) involves temporary imprisonment for purposes of security (TETS 232). Similarly, Carson explains that small boring clams and other isopods have exchanged their freedom for a sanctuary from the waves when they are "imprisoned forever" in chambers they carved themselves (TETS 18). Within a coral community, Carson describes a similar "strange association" between a crab and its coral companions:

> the gall crab makes an oven-shaped cavity on the upper surface of a colony of living brain coral. As the coral grows the crab manages to keep open a semicircular entrance through which, while young, it enters and

> leaves its den. Once fully grown, however, the crab is believed to be imprisoned within the coral. (TETS 202)

Though immured, these beings are not suffering. Instead, they have dealt successfully with the perilous realities of life. Yet the strange exchange of self-sovereignty for safety reminds me of women (like Maria Carson) who sacrifice their freedom and independence for the (possibility of) protection offered by heterosexual marriage. Given the circumstances of her own life (as I've presented them in chapters two and three), it is not a stretch to imagine that Carson might have made similar connections.[20]

What may not be surprising is that Carson's deliberate and exacting descriptions of zones and layers in the sea books are mere prelude to her real preoccupation: centering marginal landscapes, concentrating on shifting subjects, and privileging the perspective of others. Carson confessed during a speech following the publication of The Sea Around Us that the goals of literature, "whether biography or history or fiction" were in line and consistent with the goals of science, that is "to discover and illuminate the truth" (Lear, WFN 219). Trinh, a theorist, documentary filmmaker, and self-identified as multiply-othered, explains that from a marginal perspective "the best way to be neutral and objective is to copy reality meticulously. Repeated" (57). For Carson as for Trinh, the reality she observes and the truth she finds are shaped by her shifting subject position and are reflected in the narratives she creates and reproduces. Furthermore, Carson believed that instead of writers picking their subject, the subject picks the writer (Lear, WFN 287).[21] For most of her literary career, Carson wrote about the sea—a perfect shifting subject *for* a shifting subject. She focuses on landscapes that yield partial, intermittent, or mediated access, and those that prohibit access altogether. Observations that are interrupted or incomplete suggest the limitations of human senses and therefore, of human perceptions. But partial views suggest the possibility of multiple

perspectives and Carson actively promotes alternative perspectives and radical, new ways of looking at the natural world.

Carson characterizes coastal environments as in constant flux, so that on "no two successive days is the shore line precisely the same" (TETS 1). She reports repeatedly on the interchangeability between land and sea, often perceived as a sense, though not a precise one. For example, deep into the interior of the Florida Everglades, Carson finds herself reminded strongly of the distant sea. She relates the experience in present perfect tense, which enhances the sense of an ongoing and inevitable exchange between land and sea. She says,

> I have wondered at the feeling of the sea that came to me—wondered until I realized that here were the same flatness, the same immense spaces, the same dominance of the sky and its moving, changing clouds; wondered until I remembered that the hard rocky floor on which I stood, its flatness interrupted by upthrust masses of jagged coral rock, had been only recently constructed by the busy architects of the coral reefs under a warm sea. (TSAU 100)

In addition to interchangeability, Carson frequently focuses on indeterminacy in landscapes as well as their inhabitants. She claims that the shore is "only briefly and sporadically possessed by the sea" and "has in its own nature something of the land as well as of the sea" (TETS 157). She continues by reflecting on the intermediate, transitional qualities pervasive in the physical world of the shore and finds their parallels in some of the inhabitants that likewise "belong neither to the land nor entirely to the sea" (TETS 157). Thus, Carson reinforces a preference for ambiguity in the subjects she seeks in the natural world, an important point that I will return to shortly.

While she is frequently drawn to mutable shorelines, Carson finds similarly shifting features in other landscapes. Along a narrow inlet, she notes that tides move violently and uncertainly,

> for the time when the flood turned to the ebb or the ebb to the flood was different within and without the harbor, and what with the push and pull and shifting weight of tides from two sides the water in the inlet race was never still. (UTSW 141)

She demonstrates that seemingly fixed and unmoving land masses are in fact surprisingly lissome and she revises perceptions of the oceanic abyss as isolated, impassive and eternally calm. In place of the formerly popular "picture" of a black recess undisturbed by the movement of tides, Carson reveals a new one "that shows the deep sea as a place of movement and change, an idea that is far more exciting and that possesses deep significance for some of the most pressing problems of our time" (TSAU ix). Here, Carson not only privileges the shifting nature of the abyss, but highlights the shifting nature of knowledge. Furthermore, her reference to pictures being replaced by other pictures underscores a certain artifice concerning that which is known, or more accurately, that which is thought to be known (indeed, she actually links pictures and ideas by exchanging them in the parallel construction of her sentence). The production of knowledge and that which is known are significant issues that I will return to again in this chapter, as well as the next.

For now, I will propose that Carson's centering of marginal environments and privileging of characteristics associated with marginal existence is revealed most clearly in her proposition that the marginal world of the coast has not always been marginal. In fact, while Carson contends that the ocean is the mother of all things that do and have lived (see my chapter two), she locates the site where life began as the marginal world of the shore. Carson explains that it is the shore "where the drama of life played its first

scene on earth and perhaps even its prelude" and it is the shore "where the forces of evolution are at work today, as they have been since the appearance of what we know as life" (TETS 7). She reinforces this idea in The Sea Around Us by arguing that,

> [f]ar from being the original home of life, the deep sea has probably been inhabited for a relatively short time. While life was developing and flourishing in the surface waters, along the shores, and perhaps in the rivers and swamps, two immense regions of the earth still forbade invasion by living things. These were the continents and the abyss. (54)

In this passage, Carson dislocates the center of land (the continents) and the center of the sea (the abyss) by focusing her discussion of the origin of life on the borders between land and sea. In a comment that invokes Gayatri Spivak, Trinh declares that from the perspective of "others," the "center itself is marginal" and that a "woman narrates a displacement as she relentlessly shuttles between the center and the margin" (17). Carson embraces such displacement by concentrating attention on the beings that survive and even prosper in shifting, marginal landscapes.

For Carson, life in marginal worlds requires resiliency, flexibility, adaptability and a great tolerance for ambiguity. She explains that all that lives on the shore today and all that passed successfully through its borders, "by the very fact of its existence there, gives evidence that it has dealt successfully with the realities of its world" (TETS 11). Elsewhere she bolsters these concepts by exclaiming that,

> [b]y marvelous adaptations of form and structure, the inhabitants of the world between the tide lines are enabled to live in a zone where the danger of being dried up is matched against the danger of being washed away, where for every enemy that comes by sea there is another that comes by land, and where the most delicate of living tissues must

> somehow withstand the assault of storm waves that have power to shift tons of rock or to crack the hardest granite. (TSAU 159-60)

In her determined and recurrent return to marginal landscapes and her clear and steady exultation of life on the border, Carson demonstrates "a working out of and an appeal to another sensibility, another consciousness of the condition of marginality: that in which marginality is the condition of the center" (Trinh 18). In this way, Carson validates the experience of many of her readers, who may not be accustomed to such accommodation. For readers who are enfranchised and comfortable with their positions within society, she offers another opportunity to engage an alternative perspective.

For readers who are unfamiliar with the experience of living on the margins or who shuttle between fewer rather than more informing identities, Carson offers still further evidence of the efficacy of border life. She acknowledges that border zones such as "the strips between tropical tide lines" make conditions "difficult for nearly all forms of life" (TETS 211), yet these areas are frequently heavily populated. There are "cities of mole crabs" on beaches with breaking waves (TETS 153) and rocks along a turbulent inlet are "matted with creatures that love the swiftly moving current and the ceaseless eddy" (UTSW 141-42). While there are many dwellers on the border between water and land, there are other locations fertile with similar friction. For example, Carson claims that

> wherever two currents meet, especially if they differ sharply in temperature or salinity, there are zones of great turbulence and unrest, with water sinking or rising up from the depths and with shifting eddies and foam lines at the surface. At such places the richness and abundance of marine life reveals itself most strikingly. (TSAU 23)

Reminiscent of the border culture that produced Anzaldúa's mestiza, Carson's affirmation of successful and vibrant communities emerging from conflict and strife

remains both relevant and incredibly potent. In her essay "Maquiladora Mestizas and a Feminist Border Politics," Melissa Wright revisits Borderlands/La Frontera and revises Anzaldúa's image of the mestiza in order to reflect the evolution of border culture at the turn of the twentieth century. She proposes that by "reimagining the border not as [a] place of division but as [a] unified seam, where different manifestations of an essentially unified culture meet" the mestiza of present time "foresees an emerging geography that will ground a reinvigorated cultural and feminist politics" (Wright 209). In her description of borders and border life in the natural world at mid-twentieth century, Carson may have conjured the chorus to the song sung by Anzaldúa, Wright, and others. However, unlike Anzaldúa, Carson prefers ambiguity over hybridity in the most radical subjects she forges.

In the sea books, Carson regularly brings to the fore indeterminate and transitional beings. Often, these comments are contained within direct discussions of evolution as when she notes "a small snail whose race is moving landward" (TETS 244) and remarks that "snails that are now terrestrial came of marine ancestry, their forebears having at some time made the transitional crossing of the shore" (TETS 50). Imposing additional complexity, Carson claims that the first living things were "mysterious borderline forms that were not quite plants, not quite animals, barely over the intangible line that separates the non-living from the living" (TSAU 7). On coastlines today, there are examples of beings caught clearly, if not neatly between worlds. Ghost crabs seem "almost a land animal," but they must carry sea water in their branchial [sic] chambers in order to breath (TETS 157-8). There is a another crab that is undertaking the transition from sea to land life. For now, the adult form of this large white crab of the Bahamas and southern Florida breaths air and lives on land, but the early stages of its life cycle are completed in the sea (TETS 245). Carson reports that sea creatures began to move

to land-life some 350 million years ago during Silurian time, and that the first to cross the threshold was an arthropod:

> It must have been something like a modern scorpion, but, unlike some of its descendents, it never wholly severed the ties that united it to the sea. It lived a strange life, half-terrestrial, half-aquatic, something like that of the ghost crabs that speed along the beaches today, now and then dashing into the surf to moisten their gills. (TSAU 12)

On essentially the same shores, successive generations of "pioneering mollusks and crustaceans are learning to live out of the sea from which they recently came" (TETS 244). With example after example of intermediate or transitional life forms, Carson encourages an acceptance of fluidity in identity at the same time she introduces process as a appealing alternative to progress. Valuing transformation of the body and process are also ecofeminist in orientation because they resist dominant ideologies that encourage objectification and permit exploitation of the natural world.

Evolution has been traditionally understood as a linear progression, although the evolutionary development Carson describes is circuitous and includes cycles of transformation. Periwinkles grazing on intertidal rock are poised in time, waiting both for the return of the tide and for the time they will complete their present phase of evolution and move onto the land (TETS 50). The periwinkles will not be better or worse for their change of habitat; they will simply enter another state in the existence of their species. Indeed, Carson lists a number of land dwellers that have returned to the sea. She brings to life fossil records indicating that the ancestors of whales were predatory land mammals and imagines a plausible scenario by which they might have returned to the sea. She begins by suggesting that whales living on land found an abundance of fish and other edibles as they foraged about great river deltas and along shallow seas. Over

a period of centuries, these land-whales may have learned to follow their prey farther and farther into the sea. Then,

> Little by little their bodies took on a form more suitable to aquatic life; their hind limbs were reduced to rudiments, which may be discovered in a modern whale dissection, and the forelimbs were modified into organs for steering and balancing. (TSAU 45)

So sure is she of the inevitability of cyclic movement that gaps in scientific knowledge do not cause rifts in the narrative. In addition, this focus on process allows for a fluid continuity that is not possible for progress that is limited to describing only forward movement.

For Friedman, the "future of feminism and other progressive movements lies... in a turning outward, an embrace of contradiction, dislocation, and change" (4). For ecofeminists such as Donovan, turning outward must include a deliberate intention to locate subjects outside of the self and a conscientious effort to resist the pressure to objectify others, humans as well as non-humans. Donovan describes the concept of "attentive love," identified by Simone Weil and advanced by Iris Murdoch, as "a central theoretical component of the contemporary feminist ethic of care" (88).[22] Carson demonstrates a kind of attentive love for readers by actively seeking subjects in the natural world, by looking beyond what she sees, and sometimes, by not looking at all.

While Carson gathers a lot of important information from passive observation, she nevertheless reminds readers throughout the sea books that searching for subjects is an active pursuit. Some of the "most beautiful pools of the shore are not exposed to the view of the casual passer-by. They must be searched for" instead (TETS 117). Sometimes it takes a switch of perspective to find them. For example, Carson explains that in some areas, "signs of living creatures are often visible, if not the animals themselves" (TETS 131). Introducing the chapter, "The Rocky Shores," she states that

at high tide, when the brimming fullness of the see advances on the bayberries and junipers that line the coast,

> one can easily suppose that nothing at all lived in or on or under these waters of the sea's edge. For nothing is visible [. . .] all the creatures of the tidal rocks are hidden from view, but the gulls know what is there, and they know that in time the water will fall away again and give them entrance to the strip between the tide lines. (TETS 39)

While much is hidden from human eyes, it is not hidden to all. Indeed, the gulls' way of knowing has an edge over human ways. For ecofeminists, unseating vision, or "mind" knowledge, "from a privileged position as a way of knowing, or positing the notions that 'bodies' know" as a powerful strategy to destabilize attitudes that promote objectification and exploitation of other humans as well as non-human nature (Legler 230). Carson encourages readers to look actively and use a strategy that engages other perspectives when necessary in order to do so.

For humans, the capacity to see (and consequently describe) only one thing at time, reinforces a consciousness of alienation, of separation from nature. By contrast, Carson informs the reader that vision and sight can deceive and even prohibit access to, and understanding of, complex systems. For Carson, seeking subjects includes actively compensating for the limitations and imperfections of human vision. Sometimes, this is accomplished by simply drawing attention to optical illusions such as when sea foam connects grass stalks in a sandy marsh so completely that it looks "like a beach thickly grown with short grass" when in reality, the grass stands a foot tall with two-thirds its height submerged beneath the water and froth (UTSW 83). Similarly, the prevalence of rock borers in a rocky tide pool "give the illusion of shadows beside each small irregularity of bottom" (TETS 214). Frequently, Carson acknowledges and adjusts for limitations in human perception as when she points out that "the most obvious patterning

of the surface waters is indicated by color" to human senses, although these colors are only indirect signs of the presence or absence of conditions needed to support life; it may be other factors, "invisible to the eye, [that] determine where marine creatures may live" (TSAU 20, 21). In the following example, Carson models the process by which humans might begin to see beyond the range of sight. She explains:

> Somewhere in the crystal clarity of the pool my eye—or so it seemed—could detect a fine mist of infinitely small particles, like dust motes in a ray of sunshine. Then as I looked more closely the motes had disappeared and there seemed to be once more only that perfect clarity, and the sense that there had been an optical illusion. Yet I knew it was only the human imperfection of my vision that prevented me from seeing those microscopic hordes that were the prey of the groping, searching tentacles [of the resident hydroids] I could barely see. (TETS 116-17)

Adjusting for and accommodating limitations of human eyesight is an acknowledgement of the limitations of the subject.[23] See subjects requires active involvement on the part of the seer, and this consciousness can distract the observer from imposing his or her experience onto to the observed and interrupt the process by which a subject becomes an object. Finally, upsetting the correspondence between vision and knowledge is a serious hit for some of the most dominant institutions and ideologies of patriarchy. Carson makes the connection between vision and knowledge clear when she notes that eels passing from inland marshes to rivers and through the surf to the sea pass "from human sight and almost from human knowledge" (UTSW 229). Other senses and perspectives are necessary to fill the gaps left vacant by the inadequacy of sight as well as other human limitations.

For Paula Gunn Allen, the "smells, sounds, and tactile sensations that go with a locale are as central to its human significance as the sights" and it is within stories that

"all the dimensions of human sensation, perception, conception, and experience" are able to come together in meaningful and suggestive ways (234). In her recent study, Off the Reservation: Reflections of Boundary-Busting, Border-Crossing Loose Canons,[24] Allen asserts that stories about landscapes can reveal important insights into human identity. In addition to attending to the limitations of vision, Carson further confounds reliance on sight by featuring sound, feeling, fragrance, and even intuition or other body knowledge in her investigations and descriptions of the natural world. A sandollar is "soft as felt" (TETS 139) and Irish moss has the texture of Turkish toweling (TETS 80). Carson invokes sound to imbue scenes with added dimension and she even marks the marginal world of the shore with sound when she identifies the "[c]ry of shore bird and crash of surf [as] the sounds of the edge of the land—the edge of the sea" (UTSW 228). In the glowing resplendence of one small, sunlit pool, she remembers water so transparent she "could detect the interface between air and water only by the sense of coldness on [her] fingertips" (TETS 115). Appealing to other senses altogether, Carson recalls her first meeting with an ocean current. She was overwhelmed by the "sense of a powerful presence felt but not seen, its nearness made manifest but never revealed" (TSAU 131-2). Deliberately displacing vision as a primary perceptual tool is disorienting for humans that have internalized a connection between I/eye sight. Similarly, seeking with senses other than sight links knowledge with the body and consequently with the experience of women as well as non-humans and nature.

Although it is easy to forget sensations of sound when piecing together a mental picture from words on a page, Carson regularly reminds readers that it is never quiet, never still at the edge of the sea. Some of my favorite moments in the sea books include reports of voices that can be heard in the natural world. Along the rocky coast, it is clear how deeply Carson relates to the landscape as a subject when she finds "few obvious signs of life to break the spell of brooding isolation" except for "little murmurings

and whisperings born of the movements of air and water" over the jagged rocks; sounds she calls audible voices of a non-human, intertidal world (TETS 207). Some passages are cogent and take advantage of poetic techniques that rely on sound for their effect, such as alliteration, consonance, assonance. On a quiet night, the sound of breakers on a barrier beach are "but the distant voice of the sea" and, hushed almost to a sigh, there reports "a sort of rhythmic exhalation as though the sea, too, were asleep outside the gates of sound" (UTSW 14). Carson uses similarly powerful poetic devices when she plays with exchanges between silence and sound in order to create meaningful exchanges. Of her regular walk through the woods to the sea, Carson describes a scene rich with sensory impressions and worth recounting at length. Bearded lichen hangs in delicate bunches from branches over her head. A supple expanse of reindeer moss carpets the forest floor beneath her feet. Despite the lovely, enchanted appearance of the wood, it is the oscillation between sound and silence that moves her most. She recalls,

> [i]n the quiet of that place even the voice of the surf is reduced to a whispered echo and the sounds of the forest are but the ghosts of sound—the faint sighing of evergreen needles in the moving air; the creaks and heavier groans of half-fallen trees resting against their neighbors and rubbing bark against bark; the light rattling fall of a dead branch broken under the feet of a squirrel and sent bounding and ricocheting earthward. (TETS 41)

Even without visual cues, the picture she paints is astoundingly complicated and precise. Carson establishes a mood that is both interior and intimate with the sense that she is passing through a room, surrounded by subjects. The sounds of sighs and whispers she overhears suggest communication, not just utterance. The scene is inclusive and demonstrates integration on every level. The living, the dead, and the elemental mingle

in residence and there are signs from those who are just passing through. Finally, there is a distinct element of deliberation about her description that ultimately offers unparalleled opportunities to connect, engage, and interact with the natural world.

By revealing regions and beings hidden from sight, actively correcting the gaze, and promoting senses other than sight, Carson broadens the range of perception available to her readers. Furthermore, her descriptions of sound are unbounded by the limitations of human hearing, and she includes sounds which humans cannot hear, either because of a lack of range or lack of access. She reports that though mackerel have no voice of their own and murmur not a sound, the movement of great schools creates heavy disturbances in the water. Indeed,

> schools of launce and anchovies must feel the vibrations of an approaching school a long way off [. . .] and it may be that the stir of their passage is felt on the shoals below—by the prawns and crabs [. . .] by the starfish [. . .] by the sly hermit crabs, and by the pale flowers of the sea anemone. (UTSW 114)

She announces in The Sea Around Us that contrary to speculations that the deep sea is incomprehensibly silent and abysmal, there is instead "an extraordinary uproar produced by fishes, shrimps, porpoises, and probably other forms not yet identified" (51). She mentions that mammals, fishes, and crustaceans all contribute to an undersea chorus (TSAU 53) and that in tropical and subtropical regions, large populations of snapping shrimp "snap their claws so incessantly, that they are responsible for much of the extraneous noise picked up on the underwater listening devices" (TETS 219). In Under the Sea-Wind, she articulates an "attentive" listening when she recounts the unheard voices of the night that emanate from the water and the water's edge:

> It would have taken the sharpest of ears to catch the sound of a hermit crab dragging his shell house along the beach just above the water line:

> the elfin shuffle of this feet on the sand, the sharp grit as he dragged his own shell across another; or to have discerned the spattering tinkle of the tiny droplets that fell when a shrimp, being pursued by a school of fish, leaped clear of the water. (14-5)

Carson reaches beyond the perceptual and physical limitations of humans in order to show that human experience is only one relevant perspective among many others and she does so without anthropomorphizing. In this, she suggests a model for a multicultural ecofeminism that might bring "non-human actors and characters into prominence alongside the human ones from every ethnicity and nationality" (Murphy 46). Such a model imagines the possibility of a politics based on coalitions as well as an holistic approach towards engagements with the environment.

Clearly, when Carson encountered the natural world, it was with the expectation that she would meet subjects. Searching always for the subject/self in the "other," for Donovan, results in a "meditative attentiveness," a process that is critical and creative, requiring both "great patience and the disciplined ability to resist imposing one's own signifying text upon the other" but the result is pronounced, because it allows "to come into being entities which would otherwise remain concealed" (88, 92). Additionally, Carson demonstrates what Legler refers to as "an ethic of caring friendship, or 'a loving eye,' as a principle for relationships with nature" (Legler 230). When returning a medium-size man-of-war she'd found stranded on a South Carolina beach to the sea, Carson shares a profound and radical discovery with readers. While some in the family of siphonophores can deflate their air sacs in order to sink below turbulent waters, a Portuguese man-of-war cannot. After wading out into chilly March seas and hurling the creature as far as she could, Carson watches it negotiate the waves and the ebbing tide.

> Sometimes with my help, sometimes without, it would manage to take off again, visibly adjusting the shape and position of the sail as it scudded

> along before the wind [. . .]. But whether in difficulty or enjoying momentary success, there was nothing passive in the attitude of the creature. There was, instead, a strong illusion of sentience. This was no helpless bit of flotsam, but a living creature exerting every means at its disposal to control its fate. (TETS 172-3)

Here, Carson's attention to the limitations of human perception is directly related to an expansion of understanding, and in both outlook and behavior, Carson demonstrates the possibility to connect with the natural world in ways that are mutual as well as meaningful.

In another, similarly revealing moment, Carson recounts her first incredibly impressionable meeting with a live West Indian basket star, a meeting she claims she'll never forget. She remembers the "searching, exploring, testing branchlets at the tips of the arms" and remarks that they remind her of the "delicate tendrils by which a growing vine seeks out places to which it may attach itself" (TETS 225). Carson suspends outer reality, becomes lost in the moment and captivated by the basket star's "extraordinary and somehow fragile beauty," yet she does not lose her ethical perspective or authority. Indeed, she acknowledges directly, that "I had no wish to 'collect' it; to disturb such a being would have seemed a desecration" (TETS 225). The strategies that Carson advances are also heuristic devices that offer the potential for emancipatory awakening, action, and hope. For Donovan, if we are to adjust human interaction with the natural world, we must encourage the "development of forms of attention that enhance awareness of the living environment, that foster respect for its reality as a separate, different, but knowable entity" (92). As I will show in the next chapter, such an approach is highly antithetical to the proximity presumed by an objective scientific perspective, though not to Rachel Carson.

[1] For a detailed discussion of political complicity and separation for feminists, see Diana Fuss's article "Reading Like a Feminist" in the anthology, The Essential Difference.

[2] McCay refers to Gartner's study specifically twice: once in reference to thematic links in the structure of the sea books (McCay 54) and once in a discussion of Carson's use of metaphors (McCay 76), although she invokes her ideas more generally at other times. According to Lear, the "most complete literary analysis of Carson's writing remains that given by [Gartner]" (WFN 526n21) and she incorporates Gartner's analysis of the sea books into her discussion (WFN 507n74). Lear also makes reference to McCay's study, but does not cite it (WFN 526n21).

[3] According to Gartner, James and Howells were "both practitioners and theorists of American realism when it first separated from romanticism in the nineteenth century" and described its basic requirements as including "everyday subjects; common, understandable language; a close relationship of character and action with action flowing from character and character influencing action; and no inappropriate 'happy endings'" (45).

[4] It seems to me that both Gartner and McCay are reluctant to subscribe to feminist literary analysis or ascribe feminist principles to Carson work because Carson did not identify herself thus. Gartner's disease is clear when she refers to an interview that reported she was "unmarried but not a feminist" (WFN 424); Gartner claims this acknowledgement was "a gallant attempt [. . .] to save [Carson] from yet another unpopular label (Gartner 17). (Gartner does not clarify what the other unpopular label might be, but it seems likely that she is trying to avoid insinuations that Carson was a lesbian). Imagining that only feminists texts are appropriate for, or benefit from feminist analysis is a troubling trend and reveals an incredible blind spot for both Gartner and McCay.

[5] Articulating early ecofeminist attitudes, Hynes argues that "one central paradigm of modern science—the domination of nature as if nature were female and science were male—is at the root of the control of nature and the control of those declared closer to nature by reason of their biology: women" (RSS 24). For McCay, although "Carson did not specifically target women as the victims of technology, she was deeply concerned with the reproductive implications of the uncontrolled use of pesticides" (McCay 107). Even so, McCay does not communicate a strong sense of feminism (she confounds Hynes' feminist analysis with ecofeminism; her assessment of ecofeminism is fair enough, but limited and ends with "it is in the twentieth century that man has achieved the dominance he has been struggling for since Francis Bacon, the 'father of modern science,' linked the control of disorderly nature with the control of women" (McCay 107). To be fair, she never professes to present feminist analysis.

[6] While ecofeminism has roots in an array of older traditions (both academic and activist), it is itself a fairly recent movement, dating back only to the 1980s (Gaard and Murphy 5). A transgressive alchemy of feminist, environmental, peace and other progressive movements, ecofeminism emerges as a coalition with theoretical, critical, political, and activist ambitions. Karla Armbruster describes ecofeminism as heterogeneous and dynamic, making it difficult to define, although she asserts that ecofeminists "share a general conviction that there are important connections between the oppression of women and the destruction or misuse of non-human nature with male-dominated cultures. And, whether their work takes the form of theory, cultural analysis, or creative prose or poetry, they all give a sense that it is politically essential to explore and emphasize these connections if the dominations of women and nature are to be substantively challenged" (Armbruster 97).

[7] According to Greta Gaard and Patrick Murphy, while there has been a proliferation in ecofeminist literary analysis since the 1990s, it's development has "lagged behind" other ecofeminist and ecocritical theories (Gaard and Murphy 12). Similarly, Armbruster recognizes that unlike other forms of feminism, "ecofeminism has yet to evolve a significant body of literary criticism that reflects and helps to advance its political goals," although she argues that "creative, complex ecofeminist interpretations of literary texts should be able to enhance the growth of ecofeminist theory" (Armbruster 97).

[8] Lynda Birke asserts in "Feminism and the Biology of Gender," that if feminists are to change the prevailing culture of science and its underlying ideological commitments, it is imperative we "develop a less rigid view of women's (indeed, of human) biology and to see it in terms of transformation, or processes of change" (Birke 245). Though not a central theme in chapter five on Carson and science, it is an important parallel to make, here.

[9] According to Gartner, the Navy liked Carson's article on bats so much that they reprinted it for recruitment purposes (Gartner 12).

[10] It is interesting to note that although Gartner affirms that "It was important to Rachel Carson that we correct our egocentric concept of the place of human beings in the natural world" (Gartner 62), much of her analysis relies heavily on inserting, centering, and privileging a universal human perspective. According to Gartner, Carson presents broad perspectives in time and space "so that we too will see ourselves as a small part of the total picture, as dependent as any other creature on the environment around us" (Gartner 43) and central to Carson's message are "the interrelationships among human beings, their environment, and other living creatures" (Gartner 110). She explains, "Like most serious

nature writers, [Carson] believed that natural history should concentrate, not on identifications or descriptions, but on the relationships of plants and animals with each other, with their surroundings, and with human beings" (Gartner 70). Similarly, McCay writes a human presence into the center of her interpretation of Carson's portraits of natural environments. McCay claims that the "harmony of life and death, the connectedness of all parts of the ocean and the land, birds, fish, and plants is disturbed by human beings" (McCay 28). In The Sea Around Us, McCay argues that Carson reverses her position on human interaction with the natural world and is instead "fascinated by the processes scientists have used to understand the ocean" (McCay 43) yet she remained concerned, "in a manner that looks forward to Silent Spring, with what human beings did with that knowledge" (McCay 49). Still, she notes that the same book contains the chapter, "The Birth of an Island" that "best exemplifies Carson's attitude toward those who would despoil nature" (McCay 44).

[11] The standpoint epistemology that Sandra Harding explicates in Is Science Multicultural? Postcolonialisms, Feminism, and Epistemologies and elsewhere is both descendent of and corollary to the border theories that have sprung from a consideration of borders, border culture, and border crossing. While I will not refer directly to Harding's work, I will include a consideration of border theory and science in the next chapter. Other manifestations are evident in the work of performance artist, activist, and social critic Guillermo Gomez-Peña. See, for example Dangerous Border Crossers: The Artist Talks Back, where he suggests that nomadic lifestyles and "migration have become central experiences of millennial post-modernity. As our "cultural continents collide and overlap in the rapid process of 'globalization,' the ongoing migration of South to North and East to West redefines not only geopolitical borders, but also language (the currency of *lingua francas),* identity (national and personal), activism, art and popular culture. My performance accomplices and I have sailed the troubled waters created by this strange 'continental drift' in the hope that we might someday find a coastline" (11). In the section "Conversations Across the Border Fence," Gomez-Peña adds an additional boundary for border crossers to transgress: the section is comprised entirely by interviews with scholars. See Paul Jay's Contingency Blues: The Search for Foundations in American Criticism for yet another application of "border studies." According to Jay, border studies offers valuable insights for the current crisis he sees in cultural and literary criticism, that is the unpalatable choice between "neopragmantists ethnocentrism and the redemptive Emersonianism we get in [Giles] Gunn, [Richard] Poirier, and [Peter] Carafiol" (168). Instead, Jay claims that, "[r]ecent American Cultural studies has attempted to reground American literary and cultural criticism in the politics of location through analyses of the historical and geographical displacements that have configured both the Americas and our conception of 'American' identity and culture. In doing so this criticism has fashioned a whole set of poststructuralist insights into subjectivity, historiography, gender, race, ideology, and nationhood into a critical enterprise intent on reconfiguring our geographic and historical senses of the term "American," and therefore, the kind of criticism we accept as "American" cultural criticism" (Jay 169).

[12] Anzaldúa returns to the metaphor of the shore (although it is a river bank) briefly again, when she takes issue with theoretical arguments that focus on simple binaries and charges feminists to imagine a system beyond them or else remain locked within politics of opposition. She recognizes that a counterstance (opposing binary systems) is a necessary beginning, but it is only a beginning. For Anzaldúa, "the counterstance stems from a problem with authority—outer as well as inner" and while "it's a step towards liberation from cultural domination" it can not be a way of life (78). She claims that at "some point, on our way to a new consciousness, we will have to leave the opposite bank, the split between the two mortal combatants somehow healed so that we are on both shores at once [. . .]. Or perhaps we will decide to disengage from the dominant culture. Write it off altogether as a lost cause, *and cross the border into a wholly new and separate territory.* Or we might go another route. The possibilities are numerous once we decide to act and not react" (Anzaldúa 78-79).

[13] Interesting parallels that will come into play in chapter five ("Science, Sisters, and the Sea: Rachel Carson and her Refusal to be Silent on Matters of Science in the Sea Books") can be seen in the critical work of some feminist scientists. In her essay, "Feminist Scholarship in the Sciences: Where are We Know and When Can We Expect a Theoretical Breakthrough?" Sue Rosser reports on some of the characteristics that might distinguish a feminist science from traditional (Western) science: "[Ruth] Bleier suggests that central ideas to a feminist science might be the rejection of dualisms such as subjectivity/objectivity, rational/feeling and nature/culture which focus our thinking about the world... [Elizabeth] Fee has hinted that feminist visions proposed by other groups who differ in race, class, gender or tradition from the white middle or upper class Western men who are the major developers of scientific theories" may make valuable contributors to scientific inquiry (10).

[14] References to specific domestic items and spaces included here are different from Carson's depiction of domestic arrangements as discussed in chapter two. A lack of specificity in scholarship on Carson's use of domestic metaphors have conflated the two, however I argue Carson used them for distinctly different purposes and effects.

[15] As previously mentioned, there are scant few references in the sea books to items outside of nature and outside the domestic realm. While there is room for additional work in is area, I will address references to incarceration in chapter five.

[16] Women used other strategies to access exclusive realms of public discourse, including the highly hegemonic institution of science. I will discuss some of those strategies, particularly those that benefited Carson (such mentoring systems in place in academic and professional environments) in chapter five, "Science, Sisters, and the Sea: Rachel Carson and her Refusal to be Silent on Matters of Science in the Sea Books."

[17] In "The Gender/Science System: or, Is Sex to Gender as Nature Is to Science?" Evelyn Fox Keller notes that during the twentieth century, "the principal strategy employed by women seeking entrance to the world of science has been premised on the repudiation of gender as a significant variable for scientific production. The reasons for this strategy are clear enough: experience had demonstrated all too fully that any acknowledgement of gender based difference was almost invariably employed as a justification for exclusion. [These assumptions were] used to exclude them from science, or to brand them as 'not-woman'—in practice, usually both at the same time" (35). Ideologies of science have worked against women in another way. According to Eloise Buker in Talking Feminist Politics: Conversations on Law, Science, and the Postmodern, truth in science has been understood as "hard, factually objective, and masculine, whereas subjectivity is soft, opinionated, and feminine" (13). I will return to issues of women in science and particularly to Carson's experience in chapter five, "Science, Sisters, and the Sea: Rachel Carson and her Refusal to be Silent on Matters of Science in the Sea Books."

[18] Both Gartner and McCay use this sequence to demonstrate early examples of Carson's critique of human abuse of the natural world. According to McCay, "besides speaking eloquently on behalf of nature, [the sea books] highlight the ways in which humans fail to appreciate it" (McCay xi). Of Under the Sea-Wind and this particular passage, McCay acknowledges that human interaction is a miniscule part of the narrative in Under the Sea-Wind, although "fisherman intruded on the lives of the fish and the shore-dwelling birds. In fact, it was the human element that seemed always to upset the delicate balance of nature" (McCay 43). Similarly and with more verve, Gartner charges that "Man is the one wanton destroyer in Under the Sea-Wind. Although this theme is far less prominent than in Carson's later work, we see him disturbing natural cycles and balances as he captures huge numbers of the fish attempting to swim upriver to spawn, or kills merely for sport" (Gartner 43). This connection (whether true or not), illustrates the way in which readings of Silent Spring have informed critical assessment of the sea books.

[19] Gartner has commented on Carson's use of gender pronouns, but does not see a pattern, as I do. Instead, she writes it off as a rare inconsistency for Carson and a sign of the times in which she lived. Gartner recognized that Carson "labored to prevent gender-based dismissal of her beliefs," but later comments that "Carson always uses 'man' for human beings as a group. This of course was common practice in 1951—sensitivities had not yet been raised—but when she moves from clearly all-male populations, like early explorers, to more modern groups, like researchers, the verbal implications that they too are all male can be disturbing" (17, 55).

[20] Lear also suggests that Carson's access to and observance of marriages that were stifling, contentious, and abusive effected her profoundly, and asserts that perhaps these are the reasons that she herself avoided marriage. Because she offers no other explanation or even speculation, negative associations with marriage becomes the de facto reason Carson remained unmarried. I mention it because it is an example of a slippery exchange that masks both heterosexual privilege and the erasure of lesbian experience. Lear assumes Carson's heterosexuality and does not imagine as possible that a life without marriage/men might signal a condition of her being a woman-identified-woman and lesbian rather than a choice.

[21] This sentiment is echoed by Diane Freedman when she identifies herself as contemporary feminist poet-critic and acknowledges that as a "woman writer of mixed religious and class identity, "I believe marginalization has both chosen me and been chosen by me as something I wish to foreground in my life, criticism, and poetry" (D. Freedman 71). What she shares with Carson is purpose, if not intent. Freedman argues that "feminist critics' reliance on narrative, testimony, anecdote, poetry—on as self-conscious mixture or patchwork of genres—is one powerfully of re-visiting the conventional academic modes they would criticize" (D. Freedman 14-15). A similar sentiment resounds in Armbruster's work when she urges ecofeminists to borrow from feminism and poststructuralism. She claims that imagining "subjectivity as organized across multiple axes of difference, we can acknowledge the way that we foreground different aspects of our identity at different times" (Armbruster 105). For herself, she notes, "When I foreground a certain aspect or axis of identity, I can temporarily forge a connection with others who are foregrounding a similar axis of identity based on similar shaping forces in their own histories. I can establish connections without committing myself to a monolithic, static conception of identity—my

own or others" (Armbruster 105). In addition, "personal, mixed-genre metadiscursive writers [. . .] challenge the critical canon with their 'common' language and hybrid, alchemical forms as much as they do any other canon [. . .]. Combining poet with critic, they join private and public, writer and reader, and past and present as they experiment with and announce a blending of traditional genres (poetry, autobiography, drama, fiction, among them) subgenres (free-verse lyrics, fables, epigrams, diaries, exhortation), and disciplinary discourses" (D. Freedman 4-5).

[22] Although the subject for perhaps another project, there are some interesting parallels between Iris Murdoch's concept of "attentive love" and Carson's "Sense of Wonder," including the fact that both believed such a consciousness is best fostered among the young and both actively advocated the inclusion of this perspective in educating children at home and in schools.

[23] The vision metaphor has also been powerful in shaping scientific inquiry (Buker 91) as well as other patriarchal institutions and is therefore the location of potentially radical disruption. While I will not take this metaphor on in chapter five, "Science, Sisters, and the Sea: Rachel Carson and her Refusal to be Silent on Matters of Science in the Sea Books," it is an area that is rich for possibilities of further inquiry.

[24] Allen claims she chose the title, Off the Reservation: Reflections of Boundary-Busting, Border-Crossing Loose Canons "because if anything defines the American Indian peoples' post-Columbian situation, it is the freedom to leave and return to the reservation or local communities. Off reservation we are indeed a motley crew: carrying every variety of blood that has found its way to our ancient continent, faced with not only duality—that would be easy!—but with a multitude of complexities that are perhaps aptly summed up by our mixed blood, mixed culture status. Yet however mixed in ancestry, heritage, and culture, we are all, all of us Indians, and have been 'off the reservation' at all times" (Allen 6). Being inside and outside at the same time as a condition of existence is a theme expressed by Anzaldúa and articulated by many who feel trapped between identity as it is constructed and identity as it is *experienced*.

CHAPTER V.

SCIENCE, SISTERS, AND THE SEA: RACHEL CARSON AND HER REFUSAL TO BE SILENT ON MATTERS OF SCIENCE IN THE SEA BOOKS

Many of the critics who were Carson's contemporaries, as well as more recent critics of her work, agree that among her greatest accomplishments was the consistent and compelling weaving together of scientific information with poetic, awe inspiring prose.[1] This is true of the sea books, and it is true of her earliest government writing as well as for Silent Spring. As laid out in the last chapter, Carson promoted ambiguities, blurred boundaries, and shifting perspectives in the sea books, but she also interpreted and communicated complex scientific data and information with precision, accuracy, and distinction. Carson herself never imagined that scientific clarity and the qualities of beauty were antithetical elements in her writing (Lear, WFN 219). This purposeful merging had a powerful impact on her readers and has been recognized by more recent literary critics;[2] however, it has also made her contribution to science somewhat contested and certainly more difficult to trace. Much work has been done verifying the information and authenticating the data that Carson communicated, particularly concerning Silent Spring and almost entirely in response to the insidious virulence of ad hominem attacks that had been launched against her, impugning her credentials, and dismissing her work as a scientist.[3]

The sea books are not simply books about nature; they are books about science and at least one scholar has suggested that Carson's achievements as a writer have obscured "her real contribution as a scientific thinker" (Kass-Simon 257).[4] I would like that to change. In this chapter, I argue for a place of honor for Carson within scientific traditions—not only as a member, by virtue of her training and education, and active

participation in both her careers (as a scientist in federal service and a science writer), but as a critic and reformer. Coincidentally, many of the critiques she launched and reforms she promoted forecast more recent feminist engagements with science. Although she would not be accused of direct critiques of science until later in her career, Carson actively engaged science, scientific traditions, and scientists throughout The Sea Around Us, The Edge of the Sea, and Under the Sea-Wind in more ways than I will be able to address, here. Carson resisted the dominant culture and appropriated some of science's most basic tenets and ideologies in order to expose or revise them. As in previous chapters, there is a consideration of narrative techniques as well as specific metaphors central to the sea books in my discussion. But I will also suggest Carson's usurpation of the language of science, mathematics, measurement, and calibration. In addition, I will locate Carson as a scientist by tracing at least some aspects of relevant histories she was part of. There are many threads in the historic tapestry of women's involvement in science. They are inextricably linked with each other and with broader traditions of Western science, but they are not the same.

In "'Life' as We Have Known it: Feminism and the Biology of Gender," Lynda Birke identifies at least three recurring themes in feminist critiques of science, and these themes are each exhibited—consistently, but to varying degrees—in Carson's body of work. The first, which appears in some nineteenth century as well as more recent feminist criticism, "is to contest science on its own ground, to point out hidden assumptions and poor methodology" (Birke 244). A strong case could be made that Carson used science against itself in precisely this manner in Silent Spring. By incorporating incontrovertible evidence, she exposed opportunistic scientists who bartered knowledge in exchange for self as well as capital interests. Referring to Silent Spring in particular, Linda Lear calls Carson "an improbable revolutionary, even an unlikely reformer" who "challenged industrial empires, exposed a scientific establishment

that cherished its elitism, and accused the government of being irresponsible" ("Rachel Carson's SS" 23). Carson's critique is fairly overt in Silent Spring, and though more oblique in the sea books, it is present and resounding.

Carson's engagement with science in the sea books is powerful, though subtle. She gently folds disruptive strategies into the narrative structure and manipulates metaphors central to science and scientific inquiry. The second and third strands of critiques offered by Birke are related to the first, although they represent stronger and more radical approaches. Some feminist scientists go beyond simple critiques of "bad science" by emphasizing instead a social context for science and arguing that social and political relationships are reflected in both the theory and practice of science (Birke 244). Still others focus on reinterpreting existing data (244). There is evidence Carson employs both in the sea books. Picking up themes from the previous chapter, Carson not only inserts subjective experience into the sea books (particularly those attached to the perspectives of the "other"), but insists on actively seeking subjects (rather than objects) in the natural world.

In addition, Carson utilizes narrative strategies that interrupt scientific authority without rendering science and scientific inquiry meaningless. She includes and privileges multiple genres throughout the sea books and she promotes the value of ambiguities and partial perspectives. These are strategies that have roots in the writing of those on the margins and those who cross borders and branches in the writing of those who promote new ways of relating to each other and with non-human nature. According to H. Patricia Hynes, whose 1989 Recurring Silent Spring remains the only serious and sustained examination of the science of Silent Spring:

> Carson's pride in herself as a woman who achieved "firsts"—the primary place of women in her life, her recognition of science's imperative to control nature and male scientists' passivity before this, her call to

> science to seek biophilic methods and solutions—all these conditions have ensured that her work and her manner of being a woman in science contributed substantially to the emerging feminism within science. (27)

Weaving scientific information into an artistic presentation involves crossing borders between genres and epistemologies. It is a text-based transgression with resulting ruptures causing rifts in a narrative of science that has been historically constructed as objective, impersonal, and authoritative.

In her study of border crossing in writing by feminist poet-critics, Diane Freedman notes that by "pushing against perceived (even if not always actually rigid) generic and literary boundaries, cross-genre writers try to translate and traverse borders usually considered more 'real' and material than literary" (15). For Freedman, blending poetry and prose, or even more diverse amalgams of genres, enables these writers to "abandon patriarchal discourse for a discourse of unbounded fecundity" and, for writers such as Gloria Anzaldúa, Cherrie Moraga, Maxine Hong Kingston, and Adrienne Rich whom she refers to as poet-critics and "hybrids in their cultural and even writerly identities, problematic actual border crossings become metaphorically fertile" (D. Freedman 46).[5] There is a corollary in feminist analysis of science because Evelyn Fox Keller considers it "border crossing" when scientists incorporate metaphors in such a way so that "social images and scientific explanations work together to create meanings" and Eloise Buker argues that such border crossings involve politics (85).[6] I explored border crossing as motif and theme in chapter four, "Living on the Edge: Locating the Other in Rachel Carson's Three Studies of Shores and Seas;" here, I will examine border crossing as a narrative technique and suggest the powerful implications such crossings offer science.

Like the rich debris left in the tide lines, references to literature, folklore, mythology, and anecdote are scattered liberally throughout the sea books. For Carol

Gartner, literary references contribute to Carson's system of interrelationships, but while they add resonance and depth, it is "to the poetic rather than the expository aspects of her writing" (60, 59). For me, such references are both frequent and purposeful and demonstrate important links between science and storytelling. The Sea Around Us benefited most directly from the wealth of scientific information produced during World War II, but unavailable to the public until after the war ended (Lear, WFN 204), yet it is in this book that Carson opens each chapter with a passage from literature. There are excerpts from Melville, Milton, Shelley, Shakespeare, Homer, Matthew Arnold, Llewelyn Powys, and The Venerable Bede as well as biblical references from Genesis and Job.

Frequently, as in the chapter that begins the section on "The Restless Sea," passages from literature establish a mood or a metaphor that is worked out in a variety of ways in the pages that follow. For example, "Wind and Water" opens with an observation from Swinburne, whereby the "Wind's feet shine along the Sea"; Carson maintains continuity and momentum immediately thereafter by explaining that waves rolling in toward Lands End bring with them the feel of distant places (TSAU 111). The movement implicit in shimmering feet and echoed in wandering waves is tempered by some extremely technical descriptions of swells and seas and the acknowledgement that "much of our new knowledge of waves [. . .] was born of wartime necessity" (TSAU 113). The chapter proceeds to weave together lovely lilting language, folklore, and anecdotal evidence along with substantial scientific content.

In Under the Sea-Wind, references are less literary, frequently taking the form of folklore, but functioning in similar fashion. Stories and accounts of the natural world passed from one generation to the next are presented as meaningful and legitimate sources of knowledge. Carson's fishermen know when fish are gathering in schools and when the schools are ready to run through the inlet because "fishermen had told it from one generation to the next" (UTSW 85). Similarly,

> All the local fishermen knew from their fathers, who had it from their fathers, that shad coming in from the channel of the sound usually stuck in toward the west bank of the river when they entered the shallow estuary. (UTSW 19)

Carson's valuing of traditional ways of knowing such as folklore is further bolstered by interesting parallels in Under the Sea-Wind between the traditions passed from one human generation to the next, and those passed down among non-humans. For example, she notes when the mullet begin spilling out of the sound, they run "down along the coast, as mullet have done for thousands upon thousands of years" (UTSW 99), and that predators other than men wait patiently for the runs of mullet (UTSW 85). Similarly, Carson describes the sanderling Silverbar as she carries shells left over from hatched nestlings, "piece by piece, away from the nest. So countless generations of sanderlings had done before her, by their cunning outwitting the ravens and foxes" (UTSW 65). For Carson, literature, folklore, and instinct, or body knowledge are on the same plane as science. For Freedman's cross-genre writers, "interactive, fluid discourse invites readers to change to 'alchemize' themselves into writers, to cross borders both textual and psychological" (D. Freedman 55). By validating traditional ways of knowing as well as the processes by which they are communicated, Carson encourages readers to draw from their own experiences and participate actively in the making of knowledge. Empowering the perspectives of ordinary citizens subverts scientific authority at the same time it enhances science.

Carson includes passages from folklore, poetry, and prose, as well as direct references to writers and works of literature. For example, she invokes the "dark brooding poetry of the Edda" which deals with a great climatic catastrophe, "the Fimbul-winter or Götterdämmerung, when frost and snow ruled the world for generations" (TSAU 178). During her journey on the *Albatross III* as it "groped through fog over

Georges Bank all of one week in the midsummer of 1949," Carson recalls evenings when the setting sun seemed "a pale silver disc hung in the ship's rigging" and other times when drifting streams of fog filtering the radiance of morning light created "a scene the set us to searching our memories for quotations from Coleridge" (TSAU 131). These references connect science and literature within a singular, seamless narrative thereby imbruing the objectivity of science with the subjectivity of stories. Such connections remind readers that science is itself a discursive system, "a way of putting together 'facts' so that they make sense, tell a story, and explain how things work" (Buker 112). In an example that grammatically reinforces a reference to stories, Carson explains that one of the whirlpools resulting from "opposing tidal currents in the Strait of Messina," is named for "Charybdis of classical fame" by embedding the information in parenthesis (TSAU 149). Carson makes these connections more apparent still when she highlights subjectivity in science with stories of scientists and the evolution of scientific knowledge, issues I will return to shortly.

First, some additional explication: According to Ann Cudd in her essay, "Multiculturalism as Cognitive Virtue of Scientific Practice," while the foundation of scientific knowledge (at least in Western systems) is to be found in perceptual experience, scientists can achieve the objectivity required by logical empiricism or logical positivism because of the assumption that their "perceptual experience can be rigorously analyzed so as to clear away any dubitable or biased elements" (301). Carson radically undermines this precept with stories of scientists that are by turns heroic, stoic and mercurial. In The Edge of the Sea, she places the reader within the narrative to demonstrate how subjective experience can direct scientific inquiry and shape the production of knowledge. She imagines a branch of well-seasoned driftwood, sprinkled generously with the fleshy brown stalks and ivory-hued shells of barnacles, with their "marginal tints of blue and red" and remarks that "one can remember with tolerant

understanding the old medieval misconception that conferred on these strange crustaceans the name 'goose barnacle'" (TETS 184). Here, she is gentle in informing readers of the subjectivity inherent in scientific inquiry; elsewhere, she is more direct in making her case.

It is perhaps not surprising that Carson would be critical of a science that assumes absolute authority and denies subjective experience. For recent feminists, scientific epistemologies are vulnerable to critique because "the very objectivity said to be characteristic of scientific knowledge and the whole dichotomy between subject and object are, in fact, male ways of relating to the world, which specifically exclude women" (Rosser 3). In her essay, "Is the Subject of Science Sexed?" Luce Irigaray asserts similarly that "what claims to be universal is the equivalent of a male idiolect, a masculine Imaginary, a sexed world—without neutrality" because in Western traditions, it "has always been men who have spoken and especially written, in the sciences, philosophy, religion, and politics" (Irigaray 61). But Carson was part of another tradition, an ancillary tradition of women in science that is as old as science, though less visible.

Carson's experience as a scientist is complicated because hers weaves together several histories including women in academic science and women in government science, as well as a history of women's informal involvement as amateur naturalists who both contributed to scientific discovery and were central characters in the communication of scientific information. Each of these histories is additionally complicated because of women's traditional role as the object of science. Each of these histories could be filled out much more with consideration of the experience of lesbians relative to science, but that work has yet to be done.[7] Finally, in her study, Has Feminism Changed Science?, Londa Schiebinger characterizes the progress of women in science in Western history, not as a steady march of progress, but rather "by cycles of advancement and retrenchment" because in both theory and practice, "modern science

is a product of hundreds of years of active shunning of women" (HFCS 32, 11). The record is uneven at best, and at worst, incomplete. Nevertheless, it is a record worth reviewing because Carson's perspective was shaped as much by her training as a scientist as by her experience as a woman in science.

While women participated in raising public awareness and even shaping public policy during the nineteenth century (often as abolitionists, anti-vivisectionists or as part of the temperance movement), they did not generally participate in the making of knowledge. Women were encouraged in some areas of research and exploration, but their access to training was limited. For example, since its outset in 1888, the Marine Biological Laboratory at Woods Hole, Massachusetts, included women as participants in the scientific community as both students and teachers (Lear, WFN 58), and women could study marine biology at summer programs run by Louis and Elizabeth Agassiz (Norwood 165). Despite such notable exceptions, women were generally prohibited from studying at universities until late into the nineteenth century. They were denied access to formal education because of attitudes made popular by men of science in the eighteenth century.[8] Indeed, Schiebinger identifies "the Scientific Revolution of the seventeenth and eighteenth centuries" as the period when "the modern institutions and ideologies limiting women's participation in science were put into place" (HFCS 29). During the 1740s, Carl Linnaeus taught that "God gave men beards for ornaments and to distinguish them from women" (Schiebinger, NB 120), and this sentiment was buttressed by Immanuel Kant's edict that beards were a "natural" prerequisite for serious intellectual endeavors.[9] Thus, with few exceptions, "women with scientific interests were [. . .] confined to a narrow range of marginal activities, away from (or, at best, auxiliary to) the centers of prestige and innovation in research and publishing" (Gould 29). Acceptable activities included the collection and illustration of specimens for scientific research and texts written by men.[10]

Many women were able to overcome the obstacles in science only because of their proximity to men of science as sisters, daughters, or most often wives. Hannah Botsford Comstock, as already noted in chapter one, first gained acclaim by illustrating her husband's entomology textbooks and Orra White Hitchcock, married to the first state geologist of Massachusetts, was "among the first women whose drawings illustrated geological publications" (Aldrich 44). Sometimes, as in the case of Comstock, this access gave way to university employment, and between 1870 and the late 1890s, coming to science through a husband allowed a proliferation of women access to resources they would have not had otherwise. According to Margaret Rossiter, early scientist-wives "were often employed at the same institutions as their husbands," although they were generally employed in low-ranking positions as instructors, lecturers, or assistants and included women such as Comstock at Cornell University, Ellen Swallow at the Massachusetts Institute of Technology, and Louisa Reed Stowell at the University of Michigan (195). For Rossiter, this trend allowed universities to benefit from the creative energy of talented women while exploiting their productive labor, and indeed, the access garnered by these women was not without strings or limits.

While men were sometimes the portals by which women were able to access the exclusive world of science during the nineteenth century and into the early twentieth century, they exacted a precious price from them. More often than not, contributions made to science and scientific inquiry by women were eclipsed, rendered invisible, or simply assumed by the men with whom they were affiliated. According to Sue Rosser in an essay on feminist scholarship in the sciences, historically and "all too frequently, the work of women scientists [. . .] has been credited to others, brushed aside and misunderstood, or classified as non-science" (4).[11] Women employed in academia (including the so-called scientist-wives) were generally denied job security and advancement because of complicated webs of ad hoc rules, rarely written down, but

growing "informally as needed among administrators" (Rossiter 195). For example, married women were not considered for professional employment—even in the early women's colleges claiming to be committed to advancing women in academics and even when those women "were clearly the best candidate available" (Rossiter 15). Adding insult to injury, women who worked with men in general, "and especially their husbands, have traditionally been considered the lesser partners" (Schiebinger, HFCS 46). Such trends make Carson's successful government tenure and professional accomplishments quite exceptional.[12]

Women who made inroads into academia and professional employment unmediated by men, from Swallow to Carson, benefited significantly from a fairly straightforward mentoring system imbedded within academic and professional institutions. During the nineteenth and well into the twentieth century, women faculty ensured the success of their best students and the continuation of their own work by selecting and preparing their brightest students to succeed them. According to Hynes,

> The "pioneer woman scientist" would encourage her protégéé and develop a close personal relationship. She would guide her selection of a graduate school; correspond with her and oversee her progress in graduate school; and, when she was finishing, arrange a faculty position for her in the college's department. The student would join her mentor on the faculty, taking over some of her responsibilities and freeing her for other interests. When the senior faculty retired, the student would assume her position, select a protégéé and continue the tradition of excellence. (RSS 60-1)

The result was a dynamic, self-perpetuating network of influence and associates that advanced women in fields otherwise denied them. Swallow was one of several important women scientists inspired by Vasser's famed Maria Mitchell, an astronomer

and the most prominent woman professor of the nineteenth century as well as the first real "scientist" since Jane Colden in the 1750s (Rossiter 12). In turn, Swallow mentored many, actively advocated for the education of women, and championed their participation in professional associations. Similarly, Carson was both protégéé and mentor. First, she benefited from Grace Croff's and Mary Scott Skinker's experience and council, and later, "Rachel employed essentially the same process, although in abbreviated form, with Beverly Knecht, a talented young women whose writing she guided for a time" (Lear, WFN 45). The mentor system began in women's colleges, spread to universities, and was replicated in the recruitment and retention of women scientists in government service.

Despite the success of this system, women's access to university employment began to wane around the turn of the century.[13] By the 1900s faculty women who were married, including the scientist-wives, were "expected at most institutions to resign their positions whether their husbands were employed there or not, and those who came already married were not given an equal chance of employment" (Rossiter 195). Changing attitudes towards gender and the increasing professionalization in the sciences combined so that by the end of World War II,

> it was portrayed as a sign of progress to get rid of the old girls, raise salaries, reduce teaching loads, hire more Ph.D.s, rename the school a state university, and urge the faculty to get on with their research, all of which would forcibly upgrade the new school's level of prestige. (Rossiter xvi)

Repercussions of these trends were felt far and wide. Even Woods Hole, the research institution that counted leading women scientists Cornelia Clapp of Mount Holyoke College and Susan Hallowell of Wellesley College among their founding participants and had included women on the original board of trustees (Lear, WFN 58) buckled and gave

way to constriction. According to Lear, the role of women "in the governing organization had been dramatically reduced by 1900. Even so, women continued to be welcomed and were well represented as students at various levels, less so as faculty, until World War II" (Lear, WFN 58-9). Skinker attended Woods Hole, and Carson spent time there during summers in 1929 and 1932 (Lear, WFN 47, 59, 74). In 1952, Carson was elected to the Marine Biological Laboratory Corporation; she attended meetings regularly until 1961 and remained a member until her death (Lear, WFN 531n30).

Carson's time at Woods Hole was valuable professionally, intellectually and emotionally. The significance of exceptional pockets of support such as that found at Woods Hole should not be underestimated, because women who remained in science through the first part of the twentieth century faced proliferating if increasingly unacknowledged barriers motivated by ageism, sexism, and homophobia. Carson was fortunate to enjoy another supportive unique atmosphere while attending Johns Hopkins University as a graduate student. There, she became a laboratory research assistant for Raymond Pearl in the Institute for Biological Research in the School of Hygiene and Public Health (Lear, WFN 69). Receiving this assistantship was a stroke of luck, for:

> [i]n the 1920s and 1930s the medical school and the School of Hygiene and Public Health attracted a considerable number of talented female scientists. There were many more women on the staff of these schools than on the faculty of the university. Pearl's wife, Maud DeWitt Pearl, also a biologist, was the managing editor of the journal *Human Biology*. In the course of her work, Rachel must have met her as well as other female scientists living and working in Baltimore. (Lear, WFN 70)

According to Lear, in such an environment, Carson "could not help but have felt a certain psychological support for her work in association with the institute" (WFN 70). As meaningful as these exceptional experiences were to Carson personally, and as

significant as such environments were to maintaining a presence of women in science more generally, Woods Hole and Johns Hopkins' medical school and School of Hygiene and Public Health were exceptions to an overall climate of increasing hostility to women and others. Lear notes that "[a]way from Woods Hole Carson was, like most other women in the field, nearly 'invisible'" ("Rachel Carson's SS" 31) and though luckier than some, Carson was not exempt from signs that the climate was growing colder for women in general and women in science in particular.

Her plans to continue graduate school thwarted by financial deprivation and family responsibilities, Carson did not give up on her desire for a life in science. Unfortunately, she opted for a career in government science during what Keller calls the "the nadir of the history of women in American science" ("The Sex/Gender System" 36). During Carson's life and professional career, the role of women in the sciences was in serious decline and for trained women of the 1940s through the 1960s,

> [t]he evidence indicates that the growth and affluence of the period that could have made room for more and better-trained scientists of both sexes did not benefit the two equally; in fact, it generally unleashed certain forces that hastened the women's exit and subsequent marginalization and underutilization, which could then be cited to justify denying further training for their successors. (Rossiter 1)[14]

Vera Norwood refers to the same period as among "the most rabidly restrictive in American women's history," with the ideological separation of gender roles perhaps even more rigid than during the mid-nineteenth century (Norwood 144).[15] Every woman was a target for possible expulsion. Indeed, the years of security (or even mere access) for scientist-wives were over.

While the number of women in science declined, reliance on science to justify access to social resources such as housing and health care rose significantly.

Beginning with the end of World War II, the need for science to provide weaponry, demographic data, and policy analysis in the United States increased and accelerated. In Talking Feminist Politics: Conversations on Law, Science, and the Postmodern, Buker explains that,

> [c]itizens turned to science as well for guidance on how to live safely. White lab coats became the new priestly vestments automatically accorded public deference. A new laity had emerged as science appeared too complex for ordinary citizen review. (105).

Given the concurrence of these trends, it should not be surprising that Carson was critical of the growing elitism in science. What may be surprising is that Carson addressed her concerns frequently and directly in speeches and other public forums from the time she accepted a National Book Award for The Sea Around Us in 1952 until her death. In that first speech, Carson openly challenged the idea that science was separate from daily life. She announced:

> We live in a scientific age; yet we assume that knowledge of science is the prerogative of only a small number of human beings, isolated and priestlike in their laboratories. This is not true. It cannot be true. The materials of science are the materials of life itself. Science is part of the reality of living; it is the what, the how, and the why of everything in our experience. (Lear, WFN 218-19)

The sea books demonstrate both Carson's awareness of the emerging elitism in science and her response to such trends by her use of storytelling, and stories of scientists in particular. Carson furthers this critique by making clear the connection between science and storytelling.

According to Buker, "scientific propositions have been accorded the status of truth" since the age of enlightenment, while stories suggest "imagination, embellishment,

even lies" (104). Yet in the sea books, stories bridge gaps in knowledge left vacant because of human limitations as well as by the limitations of the ideologies and institutions that constitute science. Missing links and contested points do not cause breaks in the narrative or in the communication of salient details, for Carson. The Sea Around Us opens with a deliberate demonstration:

> 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. (3)

The story metaphor allows Carson to promote the efficacy of multiple and alternative perspectives in her account. In similar fashion, Carson explains that the "early history of life as it is written in the rocks is exceedingly dim and fragmentary, and so it is not possible to say when living things first colonized the shore, nor even to indicate the exact time when life arose" and "if these pages of rock history ever contained any clear record of life, it has long since been obliterated" (TETS 9). In another example, Carson describes "the book of sediments" as a "sort of epic poem" for the planet since "all is written there" and proposes that when we are wise enough, perhaps we'll be able to "read in them all of past history" (TSAU 76). Significantly, it is wisdom (grounded in personal experience), rather than science (mediated by social ideologies) that will provide that literacy.

Carson relates anecdotes of shifts in knowledge and perception among scientists that have revised our understanding of nature and suggests that scientific discovery is

irretrievably implicated with the outlook of the discoverers. Therefore the knowledge that is produced is subject always to the valences of the experiences and predilections of scientists. For example, she shows the impact of pride on scientific inquiry with a story about Magellan, the first European to cross the Pacific. Between the two coral atolls of St. Paul and Los Tiburones in the Tuamotu Archipelago, he decided to lower a sounding line:

> It was conventional line used by explorers of the day, no more than 200 fathoms long. It did not touch bottom, and Magellan declared that he was over the deepest part of the ocean. Of course he was completely mistaken, but the occasion was none the less historic. (TSAU 57)

Her story about seventeenth century botanist John Gerard shows a similar sensitivity to the influence of personal frailties on science. Evidently, according to Carson, "Gerard's imaginative eye saw in the appendages of [goose] barnacles the resemblance to a bird's feathers" and on "this slender basis" he built the widely accepted and frequently repeated fabrication that they produce actual geese (TETS 185). Although she is playful in describing the "old medieval misconception" of goose barnacles (TETS 184), the underlying suggestion is serious: the production of science and the communication of knowledge are inherently subjective processes.

In addition to the influences of personal qualities, Carson illuminates the ways in which subjectivity is shaped by social and cultural forces simply by admitting examples of these influences into her stories of scientists. She explains that the magnetic needle was first mentioned in the West as a useful device for mariners in the twelfth century, but "as much as a century later scholars were expressing doubt that sailors would entrust their lives to an instrument so obviously invented by the devil" (TSAU 208). In one of my favorite examples, Carson remarks on preferences common to taxonomizing naturalists of the nineteenth century.

> Indulging their taste for the dramatic, early naturalists named the basket stars for those monsters of Greek mythology, the Gorgons, who wore snakes in place of hair and whose hideous aspect was supposed to turn men to stone [. . .]. To some imaginations their appearance may be "snaky-locked," but the effect is one of beauty, grace, and elegance. (TETS 225)

This passage demonstrates both personal and cultural influences on the production of knowledge, and it suggests the connection between science and storytelling as well. What strikes me most is the way in which Carson restores the image of the Medusa a generation before feminist revisions would reclaim her.

Stories of scientists of the past make it easier for Carson's readers to relate to contemporary scientists as specialists in fields rather than as absolute authorities in the world. In addition, her conveyance of controversies in science—ongoing and resolved—help underscore the changing face of knowledge as well as the shifting process of scientific inquiry. For example, she notes that the topography of the ocean floor, the slopes and submarine canyons, are not only unmapped, but their origins are among "the most hotly disputed problems of the ocean" (TSAU 61). Geologists hold conflicting opinions about whether or not the incredible weight of sediments has caused the rocky ocean floor to sink a similar degree in relation (TSAU 78), although most have abandoned the "old inorganic theory that linked petroleum formation with volcanic action" (TSAU 193). Carson adds emphasis to the evolution of knowledge by making such acknowledgements an integral part of her own approach. She even offers a number of notable corrections and updates in footnotes in the 1961 edition of The Sea Around Us, including a partial resolution to the vexing point of contention among geologists concerning the evolution of oceanic terrain. These updates are appealing because, though separate from the text, they read like the next chapter of an open-ended, on-

going epic. Thus, Carson uses stories and storytelling as a way to help desanctify scientific authority "while still honoring the ways in which science promotes clear, critical analysis" (Buker 13). Carson's critiques of science can be severe, but they are fully supported, fairly administered, and balanced by her valuing of an alternative, holistic, inclusive, diverse science.

Stories of subjectivity in science include many examples of scientific work that draws from a wide variety of experiences and sources, and that values, accommodates, and even incorporates other ways of knowing in its methods. One of the scientists Carson spotlights is Swedish oceanographer Otto Pettersson, whose research interests were "perhaps a natural outcome of the circumstances of his life" (TSAU 175). Pettersson's work was significant because he marshaled scientific, historic, and literary evidence to reveal the correspondence between weather patterns and tidal cycles (TSAU 178). Similarly, Carson explains that the modern *Sailing Directions and Coast Pilots,* "now issued by every maritime nation of the world," includes "the most complete information that is available" and contains "a pleasing blend of modernity and antiquity, with unmistakable touches by which we may trace their lineage back to the sailing directions of the sagas or the *peripli* of the ancient Mediterranean seamen" (TSAU 210). In these stories, Carson shows that drawing from individual lives and the richness and diversity of human experience and cultures can help to formulate meaningful scientific theory and enhance technical prowess.

Furthermore, Carson adds the value of common sense as well as alternative ways of knowing as capable of contributing to that advancement of scientific knowledge. She reveals that in the then "ultra-modern" *United States Pilots*, navigators travelling through some remote areas of the sea were cautioned not to proceed without seeking information from those having "local knowledge" (TSAU 211), and despite the theoretical arguments and physical laws that might suggest otherwise, Carson confesses that

"[a]nyone who has lived near tidewater knows that the moon, far more than the sun, controls the tides" (TSAU 150).[16] Like much of the folklore already discussed, Carson recognizes that knowledge passed from generation to generation may contain meaningful truths, as for the generations of fishermen who know that "wind from the north means sand in your face and rough seas under your boat keel, but it means mullet, too" (UTSW 98). Carson goes even farther by leveling differences between scientists and all manner of other, not-scientists by ascribing attributes associated with scientists and scientific inquiry to non-scientists.

Though inclusion of folklore privileges traditional knowledge, generally, Carson includes traditional knowledge from both Western and non-Western perspectives thus subverting the binaries that privilege white and western over non-white and not-Western. In a chapter called "The Encircling Sea," Carson imagines a sea that embraces all life when she acknowledges that little is known of "the hardships, the difficulties, and the fears that may have beset" the earliest Polynesian explorers, yet in "open canoes they entrusted themselves to the stars and the signposts of the sea" and thus found their way from the mainland to the remote islands they would eventually settle (TSAU 204). Of coastal waters poisoned by an overabundance of dinoflagellate Gonyaulax, Carson claims that for "generations before the white man came, the Indians knew" to avoid tainted seas (TSAU 34). In fact, tribes along susceptible coasts could read the warning signs and developed an appropriate, organized response. When evidence of the onset of a red tide appeared, leaders prohibited food gathering from the sea and dispatched sentinels to protect inlanders who might not know about the danger. In an interesting parallel, Carson explains that impending storms are inscribed on the waves that precede them, but scientists are only beginning to read the signs. However, for

> generations of Pacific Island natives, a certain kind of swell has signaled the approach of a typhoon. And centuries ago, when peasants on the

> lonely shores of Ireland saw the long swells that herald a storm rolling in upon their coasts, they shuddered and talked of death waves. (TSAU 112-13)

The literacy required to interpret the signs inscribed in the natural world can be achieved through interaction and experience, as well as through authorizing education. In these examples, the primacy of Western science is trumped by traditional knowledges and in the final passage, non-Western perspectives are presented on the same level as Western ones (albeit represented by the underclass of "black" Irish). Although Carson drew from a wide range of perspectives, she resists privileging a Western scientific perspective over others.

The associations I appreciate the most are those contained in stories that assign scientific expertise to living beings other than humans. For example, Carson notes that the "plants and animals of the sea are very much better chemists than men" because to date, "our own efforts to extract the mineral wealth of the sea have been feeble compared to those of lower forms of life" (TSAU 187). In addition, Carson claims that the "upper atmosphere, even during ages before man entered it in his machines, was a place of congested traffic" and identifies spiders as early cosmonauts, having been captured alive as much as three miles above the earth's surface (TSAU 90). The impact of such associations is less anthropomorphic than pithy and clever. In addition, they subvert the dominant ideologies that inform science and Western societies at large. Others parallels are more subtle, but result in a similar affect. She emboldens some animals as explorers, whose survival suggests a direct benefit from acquired knowledge, as when she reports that the whales and seals "discovered" the existence of abundant deep-sea food sources millions of years ago and that examination of the stomachs contents of these animals today "have yielded the bones of a species of fish that has never been seen alive" elsewhere (TSAU 45, 47). In addition, Carson highlights beings

in nature that create—during the ordinary functions of their existence, no less—that which scientists can only dream of, such as the alchemy occurring offshore on the living coral reefs that fringe some island chains. In one example, Carson relishes the coral coast that is not "formed of lifeless rock or sand, but created by the activities of living things which, though having bodies formed of protoplasm even as our own, are able to turn the substance of the sea into rock" (TETS 191). These associations upset anthropocentrism and destabilize human ideas about our natural superiority in the world. Moreover, it is with narrative strategies that Carson makes the comparisons that reminds readers to reconsider other beings as active subjects (like us).

Similarly, Carson describes creatures in the natural world that outperform in the applied sciences in addition to the hard/theoretical sciences alluded to above. In particular, examples of civil engineers providing order within their neighborhoods are both abundant and adroit. Carson notes that sand hoppers perform the necessary task of cleaning the litter of "phosphates, nitrates, and other mineral substances" from the tide lines (TETS 162), although that is not the feature that impresses her most. They are small of body and delicate of leg, yet after a night of foraging along the beach, they are capable of digging deep tunnels with incredible efficiency and great dispatch. According to Carson, the resulting "shaft represents as prodigious a labor as though a man, working with no tools but his hands, had dug for himself a tunnel about 60 feet deep" in the span of 10 minutes (TETS 163). Elsewhere, Carson observes that sea cucumbers significantly impact the dispersal of material deposits around coral reefs and islands. According to some estimates, these holothurians "may redistribute 1000 tons of bottom substance" in an area less than two square miles and over the period of a single year (TETS 228). Similarly, wherever lugworms are found, both "on shores of America and Europe, their prodigious toil leavens and renews the beaches and keeps the amount of decaying organic matter in proper balance" (TETS 142). Like the unlikely pairings that

challenged traditional descriptions of gender discussed in chapters two and four, such comparisons directly address divisions that separate humans from non-humans and nature. But here, Carson is less discreet.

The references discussed in chapters two and four worked to upset opposing dualisms in favor of complexity, ambiguity, fluidity, multiplicity, tolerance, and so forth. In the sea books, dual strands that merge characteristics traditionally gendered masculine and feminine do more than suggest that living beings are comprised of aspects from both categories: they suggest that identity is socially constituted and challenge expectations fostered by such generic divisions. This strategy is not simply seditious with respect to social organization, not just another gesture critical of gender inequity; there are implications for the natural world because the land and nature are caught up in the same system of identification. Here, Carson positions disparate pairings in order to more clearly expose the codified, social system they represent. In addition to showing all manner of nonscientists conducting and excelling in the work of science, she shows specifically non-human subjects as superior to humans, in general and scientists, in particular. It is not merely an upset (where a/b becomes a and b and maybe c), it is a reversal (so that a/b becomes b/a).

There's one more issue to mention regarding Carson's references to applied sciences. In her observations of ecological communities in terms of the organization of human society, Carson recognizes beings that maintain, facilitate, and care for the systems that provide for the health and welfare of their inhabitants. She mentions the bustling cities of mussels (TETS 89) and recalls the thin rooftops of an underground city on the flats of a Georgia Beach:

> There were the chimneys and stacks and ventilating pipes of underground dwellings, and various passages and runways leading down into darkness. There were little heaps of refuse that had been brought up

> to the surface as though in an attempt at some sort of civic sanitation. (TETS 140)

Either despite these signs of civilization or because of them, Carson reports that the local inhabitants remain hidden, dwelling silently in the dark, incomprehensible world of their homes (140). Carson's references to civil engineering, public sanitation, and issues of social hygiene organized and performed by non-humans provides a radically different perspective from which to view the cultural authority of science and the social power accorded scientists, but they also signal her connection to another tradition to which she belonged: that of women scientists in government service.

When women began making inroads into government service as scientists during the nineteenth century, they generally found themselves doing work traditionally assigned to them in the home. Most women scientists were isolated as individuals or, when clustered in small groups "within certain receptive bureaus, such as the Bureau of Plant Industry at the USDA," they became "prototypes of workers in sex-typed 'women's work'" (Rossiter 218). According to Schiebinger, women "embarked on modern careers in science only after the women's movement of the 1870s and 1880s propelled them into universities" (HFCS 30) and the number of women scientists in government service increased as they began to emerge from university training in numbers. nineteenth century state and local governments were perhaps more accommodating to women than federal service. In her essay in Women of Science: Righting the Record, Michele Aldrich recalls that it was two talented women geological artists who drew for the state survey of New York during the 1840s and one became a survey district geologist and later a state paleontologist (45). However, such women were notable exceptions to a more general trend that limited access to areas traditionally conceived of as the province of women.

Departments of public health were more receptive to women scientists than other areas of government science corresponding with highly masculinized hard sciences

such as physics (Rossiter 238). Among her many accomplishments, Swallow was the first woman to serve as chemist to the Massachusetts State Board of Public Health as early as 1872 and again as that state's water analyst from 1887-1897 (Rossiter 238-9). Schiebinger describes the privatization of the household and the professionalization of science that began during the nineteenth century, as accelerating significantly around the turn of the century (HFCS 29). Like other women garnering access to public spheres, Swallow justified her work because of her gender and would subsequently be limited in her work on the very same grounds. While an employee of MIT, she helped professors

> analyze the state's water samples and also developed her interested in the composition of food and other groceries, safe drinking water, and low-cost diets for the poor. She prepared many popular works, and in 1889 she also helped several college women in Boston start their "New England Kitchen," where they prepared nutritious soups for the city's poor. (Rossiter 68)

Swallow advocated and promoted the education of women because "the home, even more than the workplace, was where primary resources such as nutrition, water sewerage and air could be monitored" (Mellor 14). She was perhaps the most visible and most accomplished in paving the way for further advances by women scientists of successive generations, but she would enjoy few of the fruits of her own labor.[17]

Despite the work of women like Swallow, Comstock, and other early, intrepid women scientists, professional women who remained in government service during the 1920s and 1930s were subject to trends similar to those impacting their colleagues in academia. According to Rossiter,

> though their numbers increased greatly, they remained clustered at the lowest levels, often in various kinds of "women's work," where they were grossly underpaid and from which they were only rarely promoted. (218)

Although there were some administrative and legislative reforms following on the heels of women's suffrage, the pattern of sex-typing persisted and even infiltrated other fields within science. Nevertheless, "when compared with their employment experience elsewhere in the 1920s and 1930s, government work was a relatively serene haven for many women scientists," and it was during these same years that "women scientists became firmly established in the federal, state, and local governments" (Rossiter 247). Women who were successful finding jobs in government frequently accessed them via informal systems like those between mentors and protégés in academia. The first wave of women scientists to enter government service following World War I was made possible because of gains made earlier by turn-of-the-century pioneers such as Florence Bascom, Mary Engle Pennington, Alive Evans, Eloise Gerry and Ida Bengston (Rossiter 219). Once the "first woman" was hired into a government agency, "she both urged other women in her field to take the appropriate Civil Service tests and performed so well in her own job that she convinced the 'appointing officer' to request more women" (Rossiter 228).[18]

With some variation, Carson's path to government service was paved in similar fashion. Skinker encouraged Carson to pursue government work in order to ease the financial burdens they both suffered from, and it is likely that she arranged the initial meeting between Carson and Higgins since Skinker and Higgins had studied together at Woods Hole and they had "colleagues in common in the intimate company of federal science" (Lear, WFN 62-3). Carson was contracted by Higgins to write radio scripts for the Bureau of Fisheries in 1935 and was hired as a junior aquatic biologist in 1936 (McCay 12) and while government service offered her an opportunity to continue in

science, there were limits to what she could do and achieve. According to Lear, Carson was subjected to many of the slights and sanctions suffered by women scientists in government service described by Rossiter in her exhaustive account ("Rachel Carson's SS" 31). Nevertheless, she was more fortunate than some because according to Rossiter,

> *a woman's career in government depended not only on her own scientific* ability but also on her predecessor's reputation, her supervisor's personality, and her agency's attitudes, for altogether they played a greater role in determining how successful and happy her experience there would be than has generally been recognized. (228)

Higgins was sympathetic to the difficulties faced by women scientists and warned Carson early on that "there were very few jobs available. A woman, he cautioned her, would never get a job in industry. She would have to depend on teaching or on government work" (McCay 10). Later as her boss and mentor, Higgins "recognized her talents and gave her good advice about her writing" (McCay 13).[19] Carson was lucky to find someone like Higgins and found working for him to be a valuable and gratifying experience that she would miss when a promotion he recommended her for in 1938 resulted in her moving to another office, and his no longer being her immediate supervisor (Lear, WFN 95).

In these and other ways, Higgins was an exception to a more general trend of appointing officers opposed to hiring women or those unwilling to hire them for any areas but those "already highly feminized at the sub-professional level" (Rossiter 223). Carson worked for the Bureau of Fisheries at the grade of an assistant aquatic biologist until 1943. After that, she worked as: an associate aquatic biologist from 1943-45; an aquatic biologist from 1945-46; an information specialist from 1946-49, and the Information Division's editor-in-chief from 1949 until 1952 when she left government service (McCay

13-4). During those 16 years, Carson may have avoided the worst injuries of gender inequity because according to Lear, "while she had a scientific classification, her work increasingly led her away from field and laboratory studies and into public information and editing, where women were more traditionally employed and accepted" (WFN 97). When she'd opted for government work, it was more a matter of capitulation than choice for Carson. Nevertheless, it worked out better for her than it did for others.

Surging beneath the crest of Carson's (relative) good fortune was Skinker's more typical experience as a woman scientist in government service. Skinker was recruited in 1936 as "the junior member of an unusual group composed largely of female parasitologists, none of whom was married and all of whom were extraordinarily fine scientists" under the dynamic leadership of Eloise B. Cram (Lear, WFN 96). Her luck would change when Cram was replaced by Emmett Price. Price actively obstructed the progress of the women under his influence and according to Lear, he was particularly vile "to the lovely, dignified Skinker, whom he teased mercilessly about being an 'old maid;'" Skinker suffered Price's abuse for 18 until her health was compromised and she was forced to quit (Lear, WFN 97). She would not recover from this experience, an experience that was in many ways more typical than Carson's. Of the women who joined NIH in the 1930s, only Cram "reached even the lowest level of management, that of chief of a section of a laboratory" (Rossiter 233-4). Carson and Skinker entered government service at approximately the same time and the differences in their experiences offer rather damning testimony of the difficulties they (and their women colleagues) faced.

Early in her government career, Carson found several advantages in addition to modest financial independence. According to Lear, Carson enjoyed her work, felt challenged by it, and the consequent utilization of "both her scientific and literary skills [. . .] reinforced her personal connections with nature, and deepened her understanding of

the ecological tapestry of marine life" (WFN 83). Mostly, her duties included gathering and analyzing information and producing reports and brochures. She conducted research which required her to visit bureau laboratories and field stations, spend hours in libraries, and even perform some routine laboratory work. She had editorial duties that required her to review and process data and reports from government and contracted scientists from every field, much of it the result of the push for advancement in science and technology fostered by World War II. Her colleagues were impressed with her work ethic and tireless research habits, and the sea books would benefit from much of this research. In addition, early in her career and during her time at Woods Hole Carson "cultivated the habit of approaching people with whom she wished to work or from whom she needed information or assistance" (McCay 9). By the 1940s when Carson was working on The Sea Around Us,

> she had put together an impressive network of scientific colleagues, experts who supported her oceanographic research and who were impressed by her ability to write not only beautiful but scientifically accurate explanations of the natural world. Some, such as Henry Bigelow, William Beebe, Robert Cushman Murphy, Richard Pough, Clarence Cottam, and Ray Fosberg, became personal friends. Others, such as Swedish oceanographer Hans Pettersson, and marine scientists Harry Ladd, Henry Stetson, Maurice Ewing, H. A. Marmer, and Daniel Merriman, were cordial colleagues with whom she enjoyed an easy intellectual exchange. (Lear, WFN 180-1)[20]

In addition, Carson established another network comprised of naturalists and nature writers "whose work she admired and drew from" such as Hendrik van Loon, Ada Govan, Edwin Way Teale, Thor Heyerdahl, Louis Halle, and Henry Beston (Lear, WFN 181). She became adept at "finding the experts in a particular field, be they literary or

scientific, and quietly and very unselfconsciously extracting the information or advice she needed" (Lear, WFN 141). By the 1950s, her network would expand to include "a remarkable network of scholars in many fields all over the world" as well as journalists, activists, and other advocates (Lear, WFN 313).[21] Carson's time in government service had important although frequently overlooked benefits for the writing she did on the side and later (Lear, WFN 333). It was during these years that Carson honed her research skills, enhanced her ability to interpret research and process scientific data, and allowed her to develop vital networks of colleagues, experts, and advocates who would support her and contribute to her success.[22] Indeed, the documented evidence included in the sea books testifies to the amazing diversity of sources Carson reviewed and incorporated. Scientific research from nearly every discipline is represented.

For Rebecca Raglon, Carson's greatest accomplishment as a nature writer and a scientist was her ability to synthesize information from a wide variety of sources and present it in such a way as to touch on all aspects of life, human and non-human; in so doing, Carson "clearly transcended the limited confines of the average scientific inquiry" (204). Traditions in Western science place originality and innovation on a higher axis than interpretation and exposition, valuing discreet studies over discursive exchanges of data. However, according to Kass-Simon,

> If it is true that the effect and indeed the function of science is to alter our perception of the universe, then it is also true that not all great scientists produce the data from which they create the new perception. Old data is often only differently organized into what then becomes our new vision of the "real" world. Further, one might argue that the importance of a scientific endeavor rests precisely on its ability to create such a new perception. (Kass-Simon 257)

Carson's government work positioned her perfectly to access an amazing diversity of science as well as scientists. She excelled at making meaningful connections with colleagues and cohorts. It was a handy talent she practiced often.

In addition, Carson systematically supplemented her own research and was "dependent upon the immense secondary literature [she] discovered and devoured" (Lear, "Rachel Carson's SS" 32). At one point she confessed with some mirth in a letter to Dorothy Freeman that she was taking to research on evolutionary biology between books "like an old alcoholic to his bottle" (Lear, WFN 280). According to Gartner, a lot of the documentation for The Edge of the Sea "came from Carson's own research and observations, but she sought help when she needed it" (74). Even Under the Sea-Wind, the most conventionally narrative and the least overtly scientific of the three, demonstrates and communicates a clear understanding of scientific principles and systems, based on research she'd conducted for Higgins, her own independent field research, as well as some of the work she'd performed as a graduate student.[23]

Demonstrations of the breadth of the research she conducted, the depth of her training, and the degree of her understanding of major convictions and ideological underpinnings of science can be seen in Carson's management of the triumvirate of tenets that together make Western science possible. They are mathematics, measurement, and calibration. Philosophers of science, critics of science, and even scientists have held for some time that mathematics is the language of science. Feminists agree. For Carolyn Merchant, a "mechanistic view of nature" based on Western mathematical traditions tracing to Plato have dominated science since at least the seventeenth century (82) and these systems claim to offer a neutrality and objectivity that supersedes or cancels out the subjective experiences and perspective of the scientist. However, mathematics is not possible without measurement. Thus, if the language of science is math, then standards of measurement are the grammars that

describe patterns in the construction of that language. For Carson, even the seemingly universal appeal of standards in measurement mask certain assumptions that are not at all neutral, not at all objective.[24]

In the sea books, Carson's reluctance to submit to a single standard of measurement suggests her resistance to perpetuating ideologies of either neutrality or objectivity. In her investigation of the language of science (the literal, discursive language), Irigaray determines that the "non-neutrality of the subject of science is expressed in different ways" (62). For example, the logical sciences are "more interested in bivalent rather than trivalent or polyvalent theories that still appear to be marginal" and "the physical sciences [that] constitute their object according to a nature that they measure in a way that is more and more formal, abstract, based upon a model" (Irigaray 63). All too frequently in the history of science, those measurements have relied on single standards that deny other systems that may be more accurate or meaningful.

Carson understood the power of mathematics and measurement but demonstrated her understanding in different ways. Her attention to measurement is more direct than her use of mathematics, and made manifest in her discussion of waves when she explains that those "higher than 25 feet from trough to crest are rare in all oceans" (TSAU 119). As evidence, Carson acknowledges that reports of higher waves have been viewed skeptically by scientists citing unreliable measurements (TSAU 119). Here, Carson establishes science's reliance on measurement although, like the many references from poetry and literature, folklore and traditional knowledge from Western and non-Western peoples, Carson casts a wide, wide net and includes multiple systems of measurement throughout the sea books.

Carson was generally unwilling to translate various systems into a standard one—even when she could have done so easily. For me, inclusion of multiple systems

of measurement draws attention to the arbitrary and artificial nature of such systems in general and levels differences among them and by extension, *differences—acknowledged or not—between originating cultures or perspectives.* As an example of the first, Carson is frequently overt with shifts between systems of measurement as when she describes the "fierce heads and toothed jaws" of glassworms as "terrible as dragons to the smaller beings of the plankton, although as men measure they were less than a quarter of an inch long" (UTSW 120) and explains of coral, that the "larger and more massive the colony, the smaller the individuals that compose it; the polyps of a branching coral taller than a man may themselves be only an eighth of an inch high" (TETS 201). She includes systems rooted in human experience, rather than scientific tradition when she explains that young fish between eight to ten inches long are called "tacks" by fisherman (UTSW 178). That those who subsist on sustenance from the sea might be closer to natural systems is evident when Carson elucidates further:

> Ordinarily, the "tacks," or eight-to-ten inch mackerel of the year, would have schooled separately, the division of small fish from large being accomplished by the slower swimming speed of the younger fish. (UTSW 195)

By including multiple systems of metrics as she communicates the language of science, Carson promotes bilingualism and even multilingualism similar to the ways that multiple languages in poetry and literature suggest borders of inclusion and exclusion at the same time they offer the possibility of reconciliation through translation and interpretation. According to Freedman, confronting readers with the first distinction reminds them, particularly those who enjoy greater as opposed to fewer privileges, that "they/I do not know, cannot have, everything" (D. Freedman 53). This message has a powerful impact on scientific authority. On the other hand, the opportunity to repair the

rift in the ideology of science is suggested when Carson encourages literacy in multiple systems of measurement.

For some, Carson's reluctance to translate multiple systems of measurement into one have been seen as ruptures representing rare inconsistencies in her work. According to Gartner, the sea books contain a "confusing mixture of units used for measuring depth" as when Carson "describes ice as fifteen feet thick and gives the depth of the Mariana Trench as 10,863 meters or about 6.7 miles, but reports a line breaking at fifteen hundred fathoms" (55). Such an amalgam is confusing only when there is an underlying expectation that uniformity and standardization is preferable. Irigaray makes apparent the limitations of reliance on a single standard in science when she calls mathematics "the theory of wholes" and claims that those preoccupied with measurement:

> concern themselves with closed and open spaces, with the infinitely big and the infinitely small. They concern themselves very little with questions of the partially open, with wholes that are not clearly delineated, with any analysis of the problem of borders, of the passage between, of fluctuations occurring between the thresholds of specific wholes. (Irigaray 63)

Differences in metrics reflect the diversity of sources Carson drew from and her own sense of ambivalence towards overly codified systems, not a deficit of ability. Carson could and did provide accurate exchanges at times, such as when she describes the waves that tore "loose, lifted, and bodily moved a mass weighing not less than 1,350 tons, or 2,700.00 pounds" and then leaves some calculation undone when she explains that five years later, a "new pier, weighing about 2,600 tons" was carried away during another storm (TSAU 121). In fact, Carson delivers mathematical formulas with clarity and confidence. She explains that "when a wave becomes a seventh as high from

trough to crest as the distance to the next crest it will begin to topple in foaming whitecaps" (TSAU 115) and the "average grain of sand is only two and a half times the weight of an equal volume of water, but more than two thousand times as heavy as air" (TETS 126). Interestingly, these formulas are in the form of ratios, mathematical exchanges that are relative, not absolute.

Finally, perhaps Carson's most, fascinating, fundamental, and radical engagement with three of the major constituents of science can be shown in an examination of her attention to calibration. Systems of measurement offer the same promise of neutral and objective perspectives as mathematics, and they too are predicated on a more elemental exchange. The promise of measurement cannot be realized without precise and absolute agreement on matters of calibration. Calibration is to measurement, what letters or characters are to grammar and language. They are the most basic building blocks. Without agreement on calibration standards, there can be neither uniformity of measurements nor reliance on mathematics.

In the sea books, Carson's appropriates and reorganizes these characters by abandoning artificial systems of measurement entirely, in favor of the relative scales of physical bodies. For example, she measures an eel "as long as a man is tall and thick and drab as a piece of fire hose" (UTSW 187). Similarly, a coastal rock wall "rises above the surface to the height of a man, and reflected, descends its own depth into the water" (TETS 111). She describes Launce as "muscular fish about as long as a man's forearm," a ctenophore as a "sac of pinkish jelly large as a man's fist," and fiddler crabs "no larger than a man's thumbnail" (UTSW 151, 138, 37). She measures the span of faint, irregular grooves left in the wake of a young horseshoe crab on its way to the sea with her own index finger (TETS 133). If there is a universal system of measurement for Carson, it is a relative one, based on a diversity of physical bodies, human and non-human.

According to Paula Gunn Allen, stories about landscapes can encourage "a deep sense of continuity within a psychespace" because a "region is bounded, characterized by geographical features, [and] these features take on a human and spiritual dimension when articulated in language" (Allen 234).[25] In Mappings: Feminism and the Cultural Geographies of Encounter, Susan Stanford Friedman asserts that "identity is literally unthinkable without narrative. People know who they are through the stories they tell about themselves and others" (8). For Friedman, the field for narrative possibility is near infinite and while such vast openness has some appeal, it lacks the material grounding that is a reality for many women and many "others." Stories such as those invoked by Allen are meaningful because they explain where we are, who we are, and why we are. These explanations may take on new and potential subversive meaning when they are refashioned and re-deployed into mainstream culture as Carson did in the sea books. In this chapter, I have suggested that Carson abandoned the "godlike, separatist viewpoint" of many scientists and in so doing, she models a system that "makes it more possible for citizens and scientists to work together to solve problems" and "opens the way for citizens to integrate a variety of ways of knowing in developing reliable information about the world" (Buker 89). Carson leveled the difference between scientists and non-scientist not by lowering standards of clear and reasoned thinking, but by raising the value of alternative perspectives (human and non-human), and introducing entirely new standards into the equation. Furthermore, although significant social change cannot be achieved without a critical consideration of the ideologies of oppression that govern science and dominate society at large, I have argued in previous chapters that Carson has done that, too. Finally, at the end of this project, I find myself more and more committed to a belief that the real work has just begun.

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[1] One notable exception came early in her literary career when she was drafting The Sea Around Us. Carson and agent Marie Rodell sought interest from magazine publishers for first serial rights, but even

those like the *Atlantic* that had previously published her work, turned chapters down. In what Lear calls "astonishingly bad judgement, many editors considered her writing too poetic for a work of non-fiction" (WFN 174).

2 For Carol Gartner, Carson was a perfectionist and "a literary artist whose subject was science" (Gartner 2). For Mary McCay, Carson was "a scientist, interested lover of nature, and chronicler of its wonders" and she explains that what Carson "saw in nature, she imitated in her art" (McCay 85, 23). According to Linda Lear, Carson imbued "the processes of nature [with] metaphorical and spiritual meaning" without compromising "the scientific accuracy of the biological events, structures, or behaviors" she depicted in Under the Sea-Wind (Lear, WFN 104). Reviewers of The Sea Around Us who praised "the fusion of poetry and prose" must have pleased Carson immensely, since she felt deeply her guiding purpose "to portray her subject with fidelity and understanding, without consideration of whether she was doing it scientifically or poetically" (Lear, WFN 219).

3 Stereotypes of Carson and misrepresentations of her credentials and work can be traced directly to critics of Silent Spring and continue to be repeated today, despite significant and indisputable evidence to the contrary. As recently as September 1999, the *New York Times* ran an article "A Tale of Public Perceptions, Global Politics and Mosquito Killers," defending and promoting the use of DDT and charging that "Ms. Carson had little scientific expertise—she edited publications for the United States Fish and Wildlife Service—but she had a flair for the dramatic" and that Silent Spring was "riddled with unintentional fiction." This despite the fact that she has been vindicated and her science born out. Even during the controversy following the publication of Silent Spring, Carson "was not without her own powerful defenders" including "H.J. Muller, the Nobel Prize winning geneticist, University of Pennsylvania anthropologist and historian of science Loren Eislely, Clarence Cottam, and Frank Elger" (Lear, WFN 437) and Houghton Mifflin compiled a series of "unsolicited, unpaid-for comments by scientists about Silent Spring" that included several medical doctors, Hermann Muller, W. C. Hueper, and Loren Eiseley (Lear, WFN 439). Moreover, the science and conclusions in Silent Spring have been confirmed in several texts, including H. Patricia Hynes' Recurring Silent Spring, Sandra Steingraber's Living Downstream, and Theo Colborn, Dianne Dumanoski, and John Peterson Myers' Our Stolen Future. I am grateful to Nancy MacKnight of the University of Maine for bringing the NYT piece to my attention.

4 Scholarship on Carson has come largely from literary critics and biographers, and they locate Carson differently in relation to scientific traditions. Gartner contends that "Carson did not always agree with traditional scientific attitudes" (75) and according to Lear, Carson "unmistakably challenged the profession" (WFN 218), although she "was never a scientific insider" (Rachel Carson's SS" 32). Still, Rebecca Raglon rightly charges that she was not always an outsider for "the critique Carson was eventually to make of certain aspects of scientific culture could not have been launched unless she had been a successful and knowledgeable participant in the culture" (199).

5 There are many interesting parallels between the writing exhibited by Freedman's poet-critics and Carson's writing; too many to cover here, although a close comparison would be a fruitful direction for a future project. For now I will mention that in addition to the connections I discuss in this chapter, Carson includes an amalgam of genres in the sea books by incorporating passages from poetry, literature, folklore, and others. I decided to include such genre-crossing in chapter five, "Science, Sisters, and the Sea: Rachel Carson and her Refusal to be Silent on Matters of Science in the Sea Books," because, coming from a scientist and appearing in a non-fiction work nature studies, such generic ruptures offer interesting implications for narratives of science and scientific inquiry.

6 Although Buker charges that Keller "makes it clear how science uses metaphors to describe interactions, what she leaves unsaid is that this border crossing involves politics" (Buker 85)

7 The few pieces I found generally looked at the ways in which lesbians have been the victims of science, including Kate Adams' "Making the World Safe for the Missionary Position: Images of the Lesbian in Post-World War II America" in the anthology, Lesbian Texts and Contexts: Radical Revisions and Estelle B. Freedman's "The Prison Lesbian: Race, Class, and the Construction of the Aggressive Female Homosexual, 1915-1965" in Sex, Love, Race: Crossing Boundaries in North American History.

8 In fact, Schiebinger has argued that "for no other reason than their sex," women "were prohibited from studying at European universities from the universities' founding in the eleventh century until the late nineteenth century" (Schiebinger: HFCS 17). In addition, Barbara Gates and Ann Shteir in Natural Eloquence: Women Reinscribe Science, have argued that women "have contributed significantly to the spread of scientific ideas" in books, essays, illustrations, and lectures written by and for women since the late seventeenth century (Gates and Shteir 3), but because their audience was mostly women and they were seen as merely popularizing science, their work is not generally recognized as contributing to the field of science. For example, during the nineteenth century, women "popularized [geology] through textbooks, articles in magazines, and even poetry. Several of them worked on the borders between geology and other disciplines, such as chemistry and geography, or wrote about geology as part of a

general view of the natural history of a landscape" and "their collective presence was a significant precedent for the more intense, professional involvement of women in geology in the 1890s and into the twentieth century" (Aldrich 52).

9 See Schiebinger's "That Majestic Beard" in the section on "The Anatomy of Difference" in Nature's Body: Gender and the Making of Modern Science for a cogent discussion of the ways in which this secondary sex characteristic influenced and shaped not only anthropological and biological classification, but social attitudes towards gender and race relations. According to Schiebinger, when Kant "launched his diatribe against learned women at the end of the eighteenth century," he chose the beards as a symbolic weapon, claiming learned women "might just as well have a beard, for that expresses in a more recognizable form the profundity for which she strives" (NB 125). Because beards "have been commonly associated with masculinity, virility, and strength" marking "both physical and moral strength and energy, respect and honor," and allowed increasing differentiation not only between men and women, but among men from different ethnic backgrounds (Schiebinger, NB 121, 120).

10 Even though their access was rare, they nevertheless left their impressions. For example, collecting activities of British women such as Mary Ann Mitchell and Eliza Maria Campbell contributed greatly to advancements in the field of geology during the nineteenth century (Aldrich 48).

11 Examples of the first include Mary Ann Mantrell who is "reputed to have discovered Iguanadon fossils, which her husband, Gideon, described in his highly regarded, widely read books on the older rocks of England" (Aldrich 48) and Catherine Green, who invented the cotton gin, although it was her employee Eli Whitney who has been credited with the discovery because he was the one to apply for the patent (Rosser 4). Brilliant women such as "Margaret Huggins (wife of astronomer William Huggins), Edith Clements (wife of the ecologist Frederic Clements), and perhaps also Mileva Maric (wife of Albert Einstein), contributed quietly to their husbands' careers" but are rarely recognized (Schiebinger: HFCS 29-30). Additionally, both Marion Randall Parsons and Jeanne Carr were overshadowed by the "supportive role" they played in John Muir's life (Hynes, RSS 6).

12 As noted in chapter three, "Parting Fronds and Probing Fingers: Rachel Carson Takes her Love to the Sea," Carson was advised by her superiors to conceal her gender as a government scientist and Mary Scott Skinker may have enlisted similar subterfuge by misrepresenting her age and graduation dates on job applications in order to deflect "both ageist and sexist attitudes in the programs or jobs that she was applying for" (Lear, WFN 499n6).

13 As an interesting tangent, Birke claims that on the one hand, it was "the push for equal rights in the public sphere, particularly in the professions and higher education, rather than feminist reliance on essentialist theories, that shifted emphasis away from the notion of 'separate spheres'" (Birke 253). Ironically, the same push that enabled women "to enter scientific professions, broke the link between women and their opposition to science" and it would be much later before feminists would begin to "question science itself in a systematic way" (Birke 253).

14 For example, Rosalind Franklin's fundamental work on the x-ray crystallography of DNA in the 1950s, "led to the theoretical speculation of the double helical nature of the molecule" by James Watson and Francis Crick, although her contribution has been ignored and continues to be undervalued today (Rosser 4). Four years after her death in 1958, Watson, Crick, and Maurice Wilkins shared a Nobel Prize for a model they built, based on her work and spaced according to her measurements (Kass-Simon 236-7). Perhaps the most relevant example is Barbara McClintock who began her work in the 1940s and is "responsible not only for much that is considered classical genetic theory, but also for what has just [recently] come to be recognized as a fundamental and revolutionary concept of gene functioning" (Kass-Simon 230). However, she would wait 35 years for that work to be recognized and appreciated; McClintock was awarded the Nobel Prize in Medicine and Physiology in 1983. Ruth Ginzberg has compared Carson with McClintock in her essay "Uncovering Gynocentric Science" claiming that common to both is an "epistemology of interconnection expressed through their careful attention to the dynamics of living systems as pieces of a larger and more awesome natural world which is constantly responding to, and responsive to, itself" (Ginzberg 71). For additional information on McClintock, see Keller's biography, A Feeling for the Organism: the Life and Work of Barbara McClintock (San Francisco: W.H. Freeman, 1983).

15 See Lynda Birke's essay in Common Science?: Women, Science, and Knowledge for a fascinating comparison of gender/sex roles in the nineteenth and twentieth centuries (346-7).

16 Carson explains that tides result from the "mobile waters of the ocean" responding to "the pull of the moon and the more distant sun" (TSAU 150). Furthermore, "[i]n theory, there is a gravitational attraction between every drop of sea water and even the outermost star of the universe, In practice, however, the pull of the remote star is so slight as to be obliterated in the vaster movements by which ocean yields to the moon and the sun" (TSAU 150).

17 At the same time, Swallow had opposed suffrage in the 1870s, advocating instead "more cautious, non-threatening ways of moving women ahead. By accepting the idea of separate 'women's work,' the

home economists had risen higher in the government than women in other fields, but to feminists this was at the high price of accepting segregation and implied inferiority" (Rossiter 121). By contrast and suggesting that "women in some scientific fields were politically more conservative" than others (Rossiter 121), Comstock advocated suffrage. She was promoted to a full-professor after many years of dedicated service to Cornell at the same time women finally achieved the vote, which she had not actively fought for, claiming, "I had been using all of my strength to fight narrowness, prejudice, an injustice, in the curriculum of the common schools, and I was weary of fighting" (Bonta 164).

18 For example, Florence Bascom, the daughter of artist and feminist mother and college professor and administrator father (Aldrich 52), a Johns Hopkins doctorate and Bryn Mawr geology professor, was also the first woman scientist at the U.S. Geological Survey in 1896 (Rossiter 219). She later encouraged her best students to take Civil Service examinations and whether through influence or by example, some of her protégés passed and were hired by the USGS (Rossiter 232).

19 Gentle and unassuming George W. McCoy, is another example of an appointing officer sympathetic the barriers faced by women scientists in government service. McCoy was surgeon and researcher on leprosy as well as the U.S. Public Health Service Hygienic Laboratory Chief; he managed to provide a supportive environment as well as encouraging the professional development of the women in his division (Rossiter 229-30). One scientist working for McCoy later complained that "for all his virtues, [he] would not give raises to single women," although such parsimonious behavior was not at all uncommon in the budget-crunching government agencies (Rossiter 234). Nevertheless, his open-mindedness was responsible for increasing the number of women scientists both in his laboratory and in government service at large. He was first to hire microbiologist Alice C. Evans, who discovered that the organism causing Bang's disease in cattle also causes the disease brucellosis in humans (Rossiter 229). Despite her gender and lack of a doctorate, McCoy urged Evans "to go to meetings and take on professional responsibilities (even representing the agency at international meetings), allowed articles to be written about her in popular periodicals, and was loyal during her long illnesses (she caught brucellosis herself and had several relapses), keeping her spirits up with accounts of work in the lab and using some ingenious tactics to keep her on the payroll after her sick leave expired" (Rossiter 230). McCoy also brought on board Eloise Cram, "a parasitologist from USDA's Bureau of Animal Industry who came to head the helminthological section of NIH's Laboratory of Tropical Diseases" (Rossiter 230) who later hired Mary Scott Skinker.

20 In the 1950s while researching Silent Spring, Carson would initiate correspondence with more scientists who could help her work and would later even defend her, including Morton Biskind, Malcolm Hargraves, C. J. Breijer, Robert Rudd, E. O. Wilson, Harold Peters, George Wallace, and Joseph Hickey (Lear, WFN 552n80).

21 Suggesting the tinsel strength of Carson's network as well as the loyalty and trust she inspired, when she was gathering information for Silent Spring, many of those who would give her confidential information did so "at great risk to their jobs and reputations" with only her word that she would protect them (Lear, WFN 334).

22 This network of "government scientists, librarians, Smithsonian Institution scientists, associates in conservation organizations at the national level and the regional Audubon Society" (Lear, WFN 333) would become increasingly important to Carson, when she began working on Silent Spring. Her interest in "the role of poisons in the environment" dated to 1938 (Lear, WFN 312), and when she began research for Silent Spring, she had been out of government for six years. According to Lear, "Many of the people she had known had been promoted to even more influential positions. Others had moved into private research institutions and enjoyed broad access to government, corporate, and university research" (WFN 334).

23 The extent to which Carson was able to incorporate her own field research is amazing, given that her ability to conduct "marine research after she joined the federal service was limited to several brief trips to Woods Hole and local excursions with family and friends. Travel was expensive, and her family obligations were enormous [. . .]. Even after she left the government in 1952, her coastal research was carried out privately, without benefit of colleague or critic, and certainly without the protection or prestige of institutional affiliation" (Lear, "Rachel Carson's SS" 31).

24 While it would be the subject for discussion in a paper other than this, I suspect that ambivalence towards systems of measurement and mathematical standards similar to Carson's may be evident in some ways in the work of other women scientists. According to Keller in "The Gender/Science System: or, Is Sex to Gender as Nature Is to Science?" women scientists for most of the last century have been "caught on the horns of an impossible dilemma—a dilemma that was unresolvable as long as the goal of science was seen as the unequivocal mirroring of nature, and its success as admitting of only a single standard of measurement" (36). For Keller and "for women scientists *as scientists*, [. . .] measures of scientific performance admitted of only a single scale, according to which, to be different was to be lesser. Under such circumstances, the hope of equity, indeed, the very concept of equity,

appeared—as it still appears—to depend on the disavowal of difference" (The Gender/Science System 35) (EFK emphasis).

[25] Spirituality in Carson's writing is a theme that has been touched on and deserves more attention that I can give it today. I will mention, however, that there are moments in McCay's study that extend to the include some nearly new age mysticism. For example, McCay notes "an almost mythic dimension" in Under the Sea-Wind (McCay 32) and claims that Carson's "tone throughout The Sea Around Us implies a reverence for the ocean that borders on the religious" (McCay 43). She examines the "mythic proportions" of Carson's science (McCay 26) and refers to the deep ocean she describes as "a Jungian collective unconscious, the repository of the world soul" (McCay 33). In addition, although "her colleague Shirley Briggs asserts that Carson was not a mystic (Briggs, 9 July 1991), there is in her reverence for the enduring rhythms of the sea a recognition that it is beyond human control or maybe even understanding" (McCay 48). She characterizes Under the Sea-Wind as "first an accurate scientific discussion of the cycles of birth and death, spring and fall, migration and return of the creatures of the sea;" then, as a series narratives describing the shore, the open sea, and the deep sea; followed by an acknowledgement of eternal earthly rhythms; and finally, as "a recognition of the potent symbol that the sea is for the writer and for most human beings" (McCay 33).

CONCLUSION

For all of the ground I have covered and all the doors I have opened in the previous pages, I close reflecting on a substantial list of issues left unexamined, under-developed, and even uncovered! First, there is a lot more of Carson's writing to be looked at, from government brochures and bulletins to freelance articles and essays. According to Cheryll Glotfelty, Carson published more than 300 pages between 1941 and 1951 and completed additional projects later, including the production of a script for a documentary on clouds and a significant work on establishing and supporting connections between children the natural world (154-5, 159). While I think much of Carson's published writing will enhance and supplement the ideas I assert, they certainly merit scholarly inspection on their own. Regardless, consideration of the sea books is hardly complete, and there are many issues to be introduced or more fully addressed in the future.

It is certainly true that individual chapters contained in this dissertation could have covered additional areas (had time, space, and my energy permitted). Perhaps this is most true of chapters four and five, which could have easily been expanded into entire studies on their own, but it is true for chapters two and three, as well. For example, there is additional room in chapters two and three for inquiries of essentialism that could supplement the discussion in chapter two, "Mother, Sea, and Material Immortality" and more work to be done in order to consider a lesbian body and lesbian narrative space set forth in chapter three, "Parting Fronds and Probing Fingers: Rachel Carson Takes her Love to the Sea." In addition, these two chapters (two and three) establish a foundation for a future consideration of collaboration in Carson's work. For me, there is significant evidence in the sea books of what some scholars have referred to as a communal or polyvocal voice, frequently (though not exclusively) attributed to writing by those who identify themselves as emerging from oral traditions.

As I argue throughout, there is much to be learned from caregivers, and there is certainly more to be learned from Carson on matters of identity, descriptions of the "other," and her promotion of the perspective of shifting subjects. While I begin to cover perceptions other than sight in chapter four, "Living on the Edge: Locating the Other in Rachel Carson's Three Studies of Shores and Seas," I omitted a detailed discussion of the vision and eyesight, including Carson's presentation of double vision, optical illusion, visual ambiguity, and paradox. Similarly, I excluded a lengthy discussion of Carson's use of metaphors of light, illumination, and darkness as cognates for knowledge, discovery, and ignorance. While these are metaphors that are deeply implicated by science, consideration could have advanced my arguments in both chapters four and five. Finally, it should not escape notice that a consideration of Carson and the history of women in the environmental movement is absent from my study. While there has been some work in this area, like most of the scholarship on Carson, it is limited to a consideration of the place of Silent Spring.

Additional valences extending from chapter five, "Science, Sisters, and the Sea: Rachel Carson and her Refusal to be Silent on Matters of Science in the Sea Books," might include a closer consideration of Carson's methodology in comparison to other women scientists. Ruth Ginzberg has compared Carson and geneticist Barbara McClintock in her essay, "Uncovering Gynocentric Science" and concluded that both revered nature, both pursued their inquiries with a holistic approach, and both had an incredible capacity to contemplate relationships and unions in alternative ways (70). Some have associated scientist and poet Sandra Steingraber and scientist Theo Colborn as following in Carson's footsteps, and Emily Herring Wilson observed recently that Professor JoAnn Burkholder of North Carolina State University "must have thought of Rachel Carson when her research on Pfiesteria in nitrogen-heavy coastal waters was attacked by critics after her study became the center of national attention and threatened

the state's tourist industry" (Wilson 43). These connections are becoming increasingly important as feminists and feminism continue to infiltrate scientific institutions and influence its epistemologies.

Furthermore, consideration of the sea books and Carson's writing as popularizations of science is both appropriate and timely. Glotfelty calls The Sea Around Us a "progenitor of popular science writing" (166) and according to Carol Gartner,

> Henry David Thoreau is credited with making the nature essay a literary form. Rachel Carson has done the same for the science book. Her work is not yet recognized as the beginning of a new literary tradition, but its influence may already have affected the best recent science books for the general public. (135-6)

These are exciting acknowledgements, although there are few scholarly works devoted to popularizers of science. While more work has been produced in recent years, including William Murdo's collection, The Literature of Science: Perspectives on Popular Scientific Writing and the September 1994 issue of *History of Science* that contained Roger Cooter and Stephen Pumfrey's "Separate Spheres and Public Places: Reflections on the History of Science in Popularization and Science in Popular Culture," there are no sustained assessments of Carson's writing in this regard (with the possible exception of Silent Spring).

I'd planned to discuss many of these issues more fully myself, and I'd mapped out entire additional chapters as well. The most difficult to withhold from this project was a consideration of Carson as an activist-artist. There are certainly important lessons to be found in Carson's life and work as well as a study of the activist-artists that have come after her. However, there are so many issues associated with her activism, that I realized it would be impossible to address them as fully and completely as I'd like. For example, concerns about the overuse of pesticides were among many issues that

Carson responded to in her writing and activism; there is some indication that during her life, she became increasingly troubled by the mistreatment and misues of animals. This concern links Carson with yet another tradition that has been obscured by the recorders of history. Not only was animal welfare an issue addressed by nineteenth century feminists, but according to Lynda Birke, antivivisection was an early critique of science "evoked largely in response to what was perceived as the thread of the growing power of the medical profession" (250). Attention to antivivisection and animal welfare declined after World War II, and although Carson was concerned that her advocacy might be used by critics "to belittle her science," she wrote the foreword to Ruth Harrison's book Animal Machines that exposed cruelty to animals raised for food in 1963 (Lear, WFN 371). I am curious about this and other issues Carson showed concern for, responded to, or was involved in, and I think consideration of these matters will only increase our understanding of her work.

In chapter one, I list a number of scientists, artists, activists, and others who have been identified as emerging from Carson's broad legacy, including close friends and associates. More recently, Rebecca Raglon has identified contemporary artist Cornelia Hesse-Honegger and writer Marilynne Robinson as emerging from Carson's legacy as they "contest the legitimacy of scientific evidence and scientific knowledge based on standards of proof and philosophical assumptions that defy common sense" at the same time they "insist on the legitimacy of their own knowledge, experiences, and feelings" (Raglon 210). Writers Ann Zwinger and Terry Tempest Williams both acknowledge Carson as an important figure in their own evolution as thinkers and writers (Glotfelty 166), and Natalie Merchant credits Carson on her 2001 release, *Motherland*. Another writer, Ann Cottrell Free, has studied the influence of Carson and Albert Schweitzer on the environmental and animal rights movements (Glotfelty 168). An examination of activism in Carson's life and writing, among her friends and associates, and among

those who have followed will provide important opportunities to understand the role of activists historically as well as to revitalize activism today. These are some of the directions my research will take, although there are still more possibilities! I am looking forward to continuing my own work on Carson and anticipate some lively discussions on her work in the future.

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