

# The Truth of the Barnacles:

## Rachel Carson and the Moral Significance of Wonder

Katheen Dean Moore

*"I believe that the more clearly we can focus our attention on the wonders and realities of the universe about us, the less taste we will have for destruction."*<sup>1</sup>  
— Rachel Carson

The wind is ferocious, an April wind butting into the headland, so I've taken shelter behind a shale bank where a stream fingers into the Pacific. The tide seethes in, lifting rock wrack, tumbling periwinkles, sliding back to sea. I'm reading about barnacles in *The Edge of the Sea*, Rachel Carson's third book. So much I never knew. I never knew that a barnacle larva will float around in the sea until it bumps into a rock that has chemical traces of other barnacles. In such a manifestly promising place, it cements the back of its head to the rock and builds a little tower of calcified plates, like a rough white volcano among the rocks in the intertidal zone. When it has finally metamorphosed into an adult, it points its feet to the sky, opens the top of the tower, and waves its feathery legs in the current, catching morsels of food and stuffing them into its mouth. When the tide backs away, it pulls its legs inside and shuts the doors behind them.

I've climbed among barnacles, cut my hands on them, leaned close to smell them, listened to them bubble in the dark, watched crows pick crabs from between them. But I never knew—I guess I never asked—about the little crustaceans within the interlocking plates. I never knew that they have eyes, then lose them when they shut themselves inside their shells. I've never seen their feet. It changes everything, to look across the fields of barnacles on the outer rocks and think about the little animals working so hard, in their own odd ways, to live. I shake my head at the wonder of it, the insanely improbable series of events that creates the little animal that gulps and flicks on a rock in the swash.

"Contemplating the teeming life of the shore, we have an uneasy sense of the communication of some universal truth that lies just

beyond our grasp," Carson wrote in *The Edge of the Sea*, and I confess I feel this too. "What truth is expressed by the legions of the barnacles, whitening the rocks with their habitations, each small creature within finding the necessities of its existence in the sweep of the surf?"<sup>2</sup>

After she published *The Edge of the Sea*, Rachel Carson wrote an article, "Help Your Child to Wonder," for the *Woman's Home Companion*. The mysteries at *The Edge of the Sea*—the ghost crabs waiting in the night, the moon setting the waves on fire, the tide edging into the bunchberries, and delight and gratitude for the mysteries—these are her topics in this slender essay.

Carson intended to turn the "Wonder" essay into a book, and what a book it would have been. "I want very much to do the Wonder book," she wrote, "that would be Heaven to achieve."<sup>3</sup> Judging from the chapter outline she sketched for her agent, the book would have been a celebration of life seen through the eyes of a scientist who loved her subjects:

The Sky  
The Woods  
The Sea  
The Changing Year  
The World of Tiny Things  
The Miracle of Life  
Beauty in Nature.

But before she could celebrate this world, she had to turn her attention to a more pressing task—protecting it. At a stage in her life when she had very little time left, all her time went into *Silent Spring*. Carson died of breast cancer soon after *Silent Spring* was published. We are left with a keen sense of loss and the Wonder article from *A Lady's Home Companion*, re-issued as a slender, illustrated book called *The Sense of Wonder*.

Wading into Pacific saltwater on the far side of the continent from Rachel Carson's beloved Atlantic, I lean over a tidepool, hoping

to see an acorn barnacle's hairy legs dance in the light. But in this wind, all I see are surging, ebbing reflections of clouds and skidding gulls. The air carries the sharp iodine smell of *fucus*, the rock-wrack. I think it's significant that "A Sense of Wonder" is positioned between *The Edge of the Sea*, a close observation of the intricate balance of life, and *Silent Spring*, a plea for its protection. A sense of wonder closes the distance between 'this is wonderful' and 'this must remain,' between the 'is' and the 'ought'. It is a bridge of moral resolve that links the physical world and the moral world. And so I believe that a sense of wonder is a moral virtue, perhaps the keystone virtue of an environmental ethic.

What are the elements of a sense of wonder? What value does it have? What difference does it make, what *in the world* difference does it make? What, I want to ask here, is the moral significance of wonder?

*The Sky. Wonder as a way of feeling and responding.*

*The Sense of Wonder* begins on the Maine seacoast at night, in the rain, "just at the edge of where-we-couldn't-see."<sup>4</sup> Of the sky, nothing is visible. Of the sea, only dimly seen white shapes. Carson and her little nephew laugh for pure joy, sharing the "spine-tingling response to the vast, roaring ocean and the wild night around us."<sup>5</sup> Carson calls a sense of wonder an emotion, but the full scope of her wonder might be better embraced by the more expansive, old-fashioned word 'passion'—when, moved by some force outside oneself, a person feels and responds. What outside force, what feelings especially, what response?—those are complicated questions.

Wonder begins with surprise. Rene Descartes defined wonder as a sudden surprise of the soul. "When the first encounter with some object surprises us, and we judge it to be new, or very different from what we knew in the past or what we supposed it was going to be, this makes us wonder and be astonished at it."<sup>6</sup> Astonish, from the Latin *tonus*, thunder, to be struck, as by lightning; the sudden flash that startles us and, just for a moment, lights the world with uncommon clarity. This calls forth a response not mediated by social

conditioning, the honest awe that Christopher Sartwell calls "the shock of the real."<sup>7</sup>

Sometimes a person is struck by the beauty of nature or the brilliance of its design. Then the response is delight. As Carson observes again and again, and as my own experiences confirm, a wondering encounter can be pure joy. I've seen a rainbow ripple in the sky, shaken like a carpet by the sonic boom from a passing jet. I've watched eagles spiral higher and higher into the sky until they disappeared altogether. One night, the sky came alive with meteors that darted and disappeared like a school of silver fish. And now, as I sit at *The Edge of the Sea*, the dull sky suddenly cracks apart and light pours through the fissure, flooding over the mussel beds, blue and steaming. I catch my breath, throw back my head, and laugh—it is that astonishing and beautiful.

But what catches a person by surprise can take her into a darker place too, a sudden encounter with the vastness of time and space where she's brushed by the sweeping wing of what cannot be known—the deeply mysterious beyond the boundaries of human experience. I felt this in a kayak at night in the Gulf of Mexico, when a dark cloud of sardines turned in a wide slow gyre under my bow, black fish in black water, moving steadily toward a place I couldn't know, flashing unexpectedly when a fish turned its silver side to the moon. I was struck by the profound otherness and indifference, or maybe the power, of what was beyond me, and by my own terrifying insignificance. So wonder can be a wash of fear—awe in the ancient sense of dread.

Carson reminded us that there is loneliness in a sense of wonder too, what she called "a sense of lonely distances," as we feel our isolation from what is profoundly apart. Loneliness turns to yearning, a kind of love, an over-powering attraction to something beautiful and mysterious and other, the desire to hold on forever to the object of our wonder, to be part of it, united with it; and mourning, knowing that the object can never be possessed.<sup>8</sup>

*The Woods. Wonder as a way of seeing.*

Separating out these elements of surprise, delight, dread and yearning is a mistake, of course, because a sense of wonder involves them all, in powerful combination. Reflecting on the complexity of wonder, Eric Grey tried to put into words his feelings when he stood for the first time at the feet of giant redwood trees. "Shock. Trembling acceptance of a thing so beautiful that I was afraid of it in ways I can't explain. Fear bleeding into love. Face-aching smiles and laughter from the center of my being; tears that came with no warning and no explanation."<sup>9</sup>

While Carson referred to wonder as an emotion, she understood it also as the capacity to see in a particular way. Carson compared wonder to a child's view of the world, where everything is new, and the child is open to—in fact, expects and watches for, even more, runs with open arms toward—a surprise around every corner. A person with a sense of wonder marvels at a redwood's muscled trunk, at a swordfern's fiddlehead, as if he were seeing it for the first time; hears as if he had never heard before the song of the winter wren or smelled the bracken-fern. Wonder is the opposite of boredom, indifference, or exhaustion—the lapse into unseeing familiarity. Standing alone on a headland one star-streaming night, watching the lights of unknowing people in their houses and cars across the bay, Carson thought, "if this were a sight that could be seen only once in a century or even once in a human generation, this little headland would be thronged with spectators, . . . but because they could see it almost any night, perhaps they will never see it."<sup>10</sup> One way to open oneself to wonder, she said, is to ask, "What if I had never seen this before? What if I knew I would never see it again?"<sup>11</sup>

The late rabbi Abraham Heschel called this new seeing 'radical amazement.' He wrote,

Wonder is a state of mind in which . . . nothing is taken for granted. Each thing is a surprise, *being is unbelievable*. We are amazed at seeing anything at all; amazed . . . at the fact that there

is being at all. . . . Amazed beyond words . . .

Souls that are focused and do not falter at first sight, falling back on words and ready-made notions with which the memory is replete, can behold the mountains as if they were gestures of exaltation. To them, all sight is suddenness.<sup>11</sup>

Understood this way, a sense of wonder is an attitude of openness or receptivity that leads a person from a preoccupation with self into a search for meaning beyond oneself. A person with a sense of wonder will lift a rotten log to see what might burrow in the dampness, will listen to the fall of rain and the subtle rustle of cottonwoods, so hard to tell apart, will go out early in the morning or late at night, not searching for something, but open to everything, exposed to the raw wind of what we can never understand. The philosopher R. W. Hepburn compared the way he gives himself to wonder to how he gives himself in friendship, "entrusting myself to another in an open and therefore vulnerable way."<sup>12</sup>

If wonder is the capacity to see as if for the first time, then wonder has a moral function, much like the moral function John Dewey found in art: "to do away with the scales that keep the eye from seeing, tear away the veils due to wont and custom, perfect the power to perceive,"<sup>13</sup> and "enter . . . into other forms of relationship and participation than our own."<sup>14</sup> Citing Dewey, aesthetician Yuriko Saito believes it is a necessary condition for any moral relationship, to cultivate the ability to set aside our own stories and recognize and sympathetically lend our ears to the story, however unfamiliar to us, told by the other.<sup>15</sup> Wonder is the open eyes, the sympathetic imagination and respectfully listening ears, seeking out the story told by nature's rough bark and flitting wrens, and by that listening, entering into a moral relationship with the natural world.

*The Sea. Wonder as a way of being.*

One of the joys of reading Rachel Carson is to watch this openness, this sense of wonder, at work in the world. Again and again,

she sought out the night. She could tell you the name of whatever she found in the beam of her flashlight, and how it was born, where it hides from the light, and what its life depends on. She was a scientist above all, trained in marine biology. All the same, she marveled at these as if she were seeing them for the first time: the intricate interdependencies, the beautiful, ineffable patterns of living and dying. Her science, this open-hearted knowing, leads her to a contemplation of the meaning of what she sees, the mystery of how such a thing can come to be.

Here, she finds a ghost crab:

The flats took on a mysterious quality as dusk approached and the last evening light was reflected from the scattered pools and creeks. . . . I surprised a small ghost crab . . . lying in a pit he had dug just above the surf. . . . The blackness of the night possessed water, air, and beach. . . . There was no sound but the all-enveloping, primeval sounds of wind blowing over water and sand, and of waves crashing on the beach. There was no other visible life—just one small crab near the sea. . . . In that moment time was suspended; the world to which I belonged did not exist and I might have been an onlooker from outer space. The little crab alone with the sea became a symbol that stood for life itself—for the delicate, destructive, yet incredibly vital force that somehow holds its place amid the harsh realities of the inorganic world. . . .

Underlying the beauty of the spectacle there is meaning and significance. It is the elusiveness of that meaning that haunts us, that sends us again and again into the natural world.<sup>16</sup>

One ghost crab, one haunted woman in the dark by the edge of the sea: in this image, Carson shows us that a sense of wonder is not just a way of feeling or a way of seeing, it is a way of being in the world. To contemplate, and thereby acknowledge the meaningfulness of the other, opens the door to a moral relationship.

A person with a sense of wonder moves quietly and humbly across

the sand, recognizing that there is a hidden world there in the night, quite apart from the brightly lit human world behind the dunes, and that this world is marvelous in itself, a fanciful world of tiny legs, sparking brains and wary eyes, sighing, striving, and dying in utter disregard of the vanities of humankind. Nature holds mysteries that the human mind has never imagined, and “answers to questions we haven’t yet learned to ask.”<sup>17</sup>

A sense of wonder impels us to act respectfully in the world. There is meaning and significance in these products of time and rock and water, far beyond their usefulness to human purposes. The sweep of time, the operations of chance have created something that leaves us breathless and rejoicing, struggling to understand the very fact of it, its colors, its squeaks and songs. It deserves respect; which is to say that a sense of wonder leads us to celebrate and honor the earth.

And, yes, a sense of wonder shows us our own responsibilities to care for the objects of wonder—to do them no harm, to protect their thriving. But more about this in a moment.

*The Changing Year. What is the value of a sense of wonder?*

There are instrumental values to a sense of wonder, and Carson takes pains to articulate them in her essay, urging parents to give their children the gift of the land and the sea. Her words, and her life, teach that a close relationship with the natural world is a source of strength, healing, and renewal. “Those who contemplate the beauty of the earth find reserves of strength that will endure as long as life lasts,” she wrote.<sup>18</sup> And in fact, during those terrible times when Carson struggled for the strength to continue her work even as she was dying of cancer, she found comfort at her beloved coast. There, when winter turned to spring, sanderlings stopped to feed on sandy beaches as they migrated through ancient cycles of living and dying and living again that Carson chronicled over and over, the life cycles of the barnacles, the journeys of the eels, the necessity of death to life. “There is something infinitely healing in the repeated refrains of nature,” Carson wrote, “—the assurance

that dawn comes after night, and spring after the winter."<sup>19</sup>

But more than this. Wonder deepens lives that might otherwise be shallow, probing depths of meaning and allowing a person fully to experience the rich texture of a life. "If I had influence with the good fairy who is supposed to preside over the christening of all children," she wrote, "I should ask that her gift to each child in the world be a sense of wonder so indestructible that it would last throughout life, as an unfailing antidote against the boredom and disenchantment of later years, the sterile preoccupation with things that are artificial, the alienation from the sources of our strength."<sup>20</sup>

I think of "sterile preoccupations" and marvel that Carson could have so clearly foreseen our own time, fifty years away. The economic forces of our lives are centripetal, tending to spin us in smaller and smaller circles, creating a kind of solipsism that comes from separation from the natural world and our biocultural communities. It's not that we aren't natural creatures, it's not that we don't live always in the most intimate contact with the natural world that seeps in our pores and rushes through our blood. It's that we lose track of that fact or deny it, and so shut ourselves off from a large part of our own humanity. We measure our successes and failures against our own mean interests, and so they grow to grotesque proportions. Self-importance, self-absorption bloat and distort our lives and our relationships.

Meanwhile, Earth turns, birds fly north or south, fish rise or sink in the currents, the moon spills light on snow or sand, and we—do we think we turn the crank that spins the earth? A good dose of wonder, a night of roaring waves, a faceful of stars, the kick in the pants of an infinite universe, the huge unknowing—these remind us that there is beauty that we didn't create. There is mystery we cannot fathom. There are interests that are not our own. There is time we cannot measure. When we live humbly in full awareness of the astonishing fact that we have any place at all in such a world, we live richer, deeper lives, more fully realizing our humanity. Philip Cafaro has made the argument that Carson's moral views

fall into the tradition of virtue ethics.<sup>21</sup> Following Aristotle, he defines virtues as "qualities which allow a person to fulfill his or her proper or characteristic functions, and to flourish as a good of his or her kind."<sup>22</sup> A virtue ethic asks after those qualities: What is a good life for a human being, and what are the personal qualities that allow a person to thrive? So also does *The Sense of Wonder* urge on readers a vision of what qualities might help a child thrive. Here is Carson taking her nephew by the hand and leading him to the places that have brought her so much comfort and fulfillment, crawling on hands and knees after singing insects, showing by her example how he also might live a significant and joyful life in close relation to nature. So I think that a sense of wonder is a virtue in just this sense, finding what it means to be fully human in a celebration of our place in the more-than-human world.

But Carson has a larger point to make. A sense of wonder is an important element of human thriving, yes. But a sense of wonder offers hope also for the thriving of the more-than-human world. Wonder is an antidote to the view that the elements of the natural world—sanderlings, shale reefs, ancient pines—are merely means to human ends, commodities to be disdained or destroyed. Wonder reminds us of the essential worth of the world we're part of, as it reminds us of how much we love its birdsong and beauty. And so it reminds us of the responsibilities that grow from that regard. Carson: "Wonder and humility are wholesome emotions, and they do not exist side by side with a lust for destruction."<sup>23</sup> If she's right, wonder may be the keystone virtue in our time of reckless destruction, a source of decency and hope and restraint.

*The World of Tiny Things. What is the moral significance of wonder?*

Leaving the beach, I climb into the dim light of the fogbound headland where wind has raked the pines to the ground and reduced the plants to miniature forms of their inland kin. I lie across a rocky outcrop and look down on a dwarf garden. Surf beats a slow pulse, light rises and dims as shreds of fog blow through, a foghorn murmurs in time. Here are blue iris, the Douglas iris, with stems only two inches

high. Pink checkerblooms crawl among yarrow in flat rosettes, sessile buttercups, and spreading mats of a flower called goldfields, so bright that I'm tempted to warm my hands over its yellow fire. If I look down, I am in an elfin country garden, drenched with color. If I look out toward the wavering white line of surf disappearing into fog, I find myself in a strange world, neither land nor sea.

Rachel Carson didn't draw explicit moral conclusions in the Wonder essay, and if she had lived long enough to write the book on wonder, I'm not sure she would have made explicit the moral sensibility that built so strong a foundation for *Silent Spring*. So let me simply say what I believe is true. We live in the physical world of rocks and buttercups, and at the same time, we live in a moral world of hopes and a vision of what ought to be. Some philosophers and scientists would have us believe they are different worlds, the 'is' and the 'ought'. But I believe the worlds come together in a sense of wonder. The same impulse that says, this is wonderful, is the impulse that says, this must continue. A sense of wonder that allows us to see life as a beautiful mystery forces us to see life as something to which we owe respect and care. If this is the way the world is: extraordinary, surprising, beautiful, singular, mysterious and meaningful; then this is how I ought to act in that world: with respect and celebration, with care, and with full acceptance of the responsibilities that come with my role as a human being privileged to be a part of that community of living things. Wonder is the missing premise that can transform what-is into a moral conviction about how one ought to act in that world.

Carson came close to making this same argument in *Silent Spring*. "The natural landscape is eloquent of the interplay of forces that have created it. It is spread before us like the pages of an open book in which we can read why the land is what it is, and why we should preserve its integrity. But the pages lie unread."<sup>24</sup>

*The Miracle of Life. What, then, shall I do?*

What, then, is a person to do? I think Carson's answer would be, cultivate wonder. If you are a nature writer, cultivate wonder in

your readers. If you are a professor and a scientist, cultivate wonder in your students. If you are a parent, cultivate wonder in your children. And since you are a human being, no matter where you are or what you are doing, live openly and deeply and gratefully, wading hip-deep into the dark mysterious sea.

As she accepted the John Burroughs Award for excellence in nature writing, Carson used the opportunity to urge fellow writers to create a new kind of nature writing in response to the urgency of the times. "I myself am convinced," she said, "that there has never been a greater need than there is today for the reporter and interpreter of the natural world." Human beings have created an artificial world, insulated by glass and steel, she explained. Behind their closed doors and locked windows, they have lost track of the beauty of the natural world and the essential processes of water and land and living seeds that their lives depend on. Worse, "intoxicated with a sense of [their] own power, [they seem] to be going farther and farther into more experiments for the destruction of [themselves and their] world." Nature writers—almost by definition people who have been moved by their awareness of the natural world—have a unique and urgent opportunity to convey their sense of wonder to the public, which is hungry for connection to something meaningful and astonishing. "We have been far too ready to assume that these people [who have very little knowledge of natural science] are indifferent to the world we know to be full of wonder. If they are indifferent it is only because they have not been properly introduced to it—and perhaps that is in some measure our fault."<sup>25</sup>

And what of scientists? According to biographer Linda Lear, Carson told her friend Dorothy Freeman "that she considered her contributions to scientific fact less important than her attempts to awaken an emotional response to the world of nature."<sup>26</sup> Once the emotions have been aroused and a person senses the beauty and excitement of something new and unknown, Carson said, the person will want more knowledge about the object of that emotional response. In that context, the knowledge will become important and meaningful.

Carson made the point again in *A Sense of Wonder*. You don't have to know the names of the plants and animals to nurture a sense of wonder in a child. "It is not half so important to *know* as to *feel*."<sup>27</sup> And then she offered a beautiful analogy that goes like this: Think of the emotions and the sense impressions as the soil. Prepare that soil, make it rich and nourishing. Scientific facts are the seeds. Planted in that fertile soil, the facts will grow into knowledge and wisdom.<sup>28</sup> I would go further: If those seeds land on barren stone, or on the sticky floor of a video arcade or the shag carpet of the TV room, they will never sprout. Scientific facts are essential. But a scientist who has lost a sense of wonder, or scientists who try to teach facts without feeling, will not find their work transformed into the wisdom and knowledge that the times so urgently require.

As for parents, they should nurture the sense of wonder that a child is born with. And how is that to be done? "If a child is to keep alive his inborn sense of wonder . . . he needs the companionship of at least one adult who can share it, rediscovering with him the joy, excitement and mystery of the world we live in."<sup>29</sup> Take your child by the hand, and look up at the sky, Carson advised in the Wonder article. Listen to the wind. Feel the rain on your face. Ponder the mystery of a growing seed. "Drink in the beauty, and think and wonder at the meaning of what you see."<sup>30</sup> Savor the smell of low tide, and the child, grown up, will smell the tide again and "savor the rush of remembered delight."<sup>31</sup> And then Carson told of her plan to take her nephew into the garden in the fall. With flashlights, they would search for the crickets and katydids that play their music in the damp grass, and seek out the fairy bell ringer, an insect Carson has never found, no matter how many times she followed the chimes of a tiny silver bell.

In reading Carson's list of titles for chapters in the planned book version of *The Sense of Wonder*, I was surprised to find, almost at the end, "The Miracle of Life." Carson was not a person to use words carelessly, so it was surely no oversight that the words "the miracle of life" appear here, but never appeared in the Wonder essay that was to be the basis of the book. I'd always thought that for Carson the true

miracle of life is that it's no miracle at all—no divine violation of physical processes—but rather the working out of physical processes in all their beautiful and mysterious variety. Puzzled, I looked up 'miracle' in the dictionary. There I found what Carson had probably known all along: **Miracle**, n. from *miraculum*, from *mirari*, to wonder at.

*Beauty in Nature. Conclusions.*

When I return late at night to the parking lot at the coast, my headlights sweep over twisted cypress and clumps of beach grass, unmoving now the wind has died. I pull on a jacket and follow my bobbing flashlight down the dunes trail to the beach. The fog has cleared and stars scatter over sea-waves that lift and lengthen the stars' reflected light. It's a long, low tide, the slosh of waves faint and far away. A flock of resting shorebirds startles from sleep. They rise in a great rush of air and fly off, their little cries falling like confetti. I play my light over the crusted rocks and shiny slabs of kelp, the strange land that appears and disappears with the phases of the moon. Finding a dry place to sit among the barnacles, I turn off the light and sit uneasily in the dark.

At first, I don't hear much. The sea itself, the soft breathing in, the asthmatic breathing out. A single peep, maybe a shorebird lost in the rush. A thread of sand sifting down the cliff behind. Then gradually, spaces between the rocks begin to tick and pop. Seaweed squeaks in the rise and fall. I force myself to be still while the animals get used to my presence, then I switch on the flashlight and peer into a tidal pool. In the narrow beam, a green anemone sways over a pink crust of coralline algae, and periwinkles inch along their little paths. I lean close to a patch of barnacles and finally I see them: the fluttery legs emerge thin as dotted lines from the barest crack between the barnacles' plates. The legs wave like ephemeral beckoning hands, each movement helping to sustain the life of the little spark that lies on its head inside the shell.

What truth is expressed by the legions of the barnacles, whitening the rocks, or the "sea lace, existing for some reason inscrutable to us,

a reason that demands its presence by the trillion amid the rocks and weeds of the shore?" Rachel Carson's answer is the last line from *The Edge of the Sea*, the sentence she asked to have read at her funeral after she died with so much work left to be done. "The meaning haunts and ever eludes us," she wrote. But, "in its very pursuit we approach the ultimate mystery of Life itself."

There is moral significance in the search for meaning, and virtue in the life of one who seeks—like Carson, attentive and grateful, careful with science and open to mystery, humble and respectful, rejoicing in the fact of things, willing to be surprised. I don't know if humans are the only beings who wonder. But I do know that we have a great capacity to wonder at the world that ticks and sighs around us, and it may be that we will find the fulfillment of our potential as human beings in our awareness of the astonishing world, our care, and our thanksgiving.

## ENDNOTES

- 1 Rachel Carson, Speech to Theta Sigma Phi (April 21, 1954).
- 2 Rachel Carson, *The Edge of the Sea* (Boston: Houghton Mifflin, 1955), p. 250.
- 3 Rachel Carson to Dorothy Freeman, *Letters* (n.d. [early February 1963]).
- 4 Rachel Carson, *The Sense of Wonder* (New York: HarperCollins, 1965), p. 15.
- 5 Carson, *The Sense of Wonder*, p. 15.
- 6 Rene Descartes, *The Passions of the Soul* (Indianapolis: Hackett, 1989), p. 52.
- 7 Crispin Sartwell, *Obscenity, Anarchy, Reality* (New York: SUNY Press, 1996), pp. 7-8.
- 8 Marguerite La Caze, "The Encounter between Wonder and Generosity," *Hypatia*, vol. 7, no. 3, p. 5; making reference to Irigaray, Luce, *An Ethics of Sexual Difference*, trans. Carolyn Burke and Gillian Gill (Ithaca: Cornell University Press, 1993), pp. 13, 75.
- 9 Eric Grey, personal communication, 3/30/04.
- 10 Carson, *The Sense of Wonder*, pp. 68-9.
- 11 Carson, *The Sense of Wonder*, p. 67.
- 12 Abraham Heschel, "Radical Amazement," *Man is Not Alone: A Philosophy of Religion* (New York: Farrar Straus and Young, 1951), pp. 12, 13, 15.
- 13 R. W. Hepburn, "Wonder," *Wonder and other Essays: Eight Studies in Aesthetics and Neighboring Fields* (Edinburgh: Edinburgh University Press), 134; quoted in La Caze, "The Encounter," p. 5.

- 14 John Dewey, *Art as Experience* (New York: Capricorn Books, 1958), p. 325. Quoted in Yuriko Saito, "Appreciating Nature on Its Own Terms," *Environmental Ethics* 20 (1998): 135-49.
- 15 Dewey, *Art as Experience*, p. 333.
- 16 Saito, "Appreciating Nature on Its Own Terms," p.142.
- 17 Carson, *The Edge of the Sea*, pp. 5, 7.
- 18 Carson, *The Sense of Wonder*, p. 87.
- 19 Carson, *The Sense of Wonder*, p. 38.
- 20 Carson, *The Sense of Wonder*, p. 54.
- 21 Philip Cafaro, "Thoreau, Leopold and Carson: Toward an Environmental Virtue Ethics," *Environmental Ethics* 23 (2001): 3 - 17.
- 22 Cafaro, "Thoreau, Leopold, and Carson," 10n.
- 23 Rachel Carson, "Design for Nature Writing," Acceptance Speech for the John Burroughs Medal (April 7, 1952). Reprinted in Linda Lear, *Lost Woods* (Boston: Beacon Press, 1998), p. 94.
- 24 Rachel Carson, *Silent Spring* (New York: Fawcett World Library, 1962), p. 65. Cited by Philip Cafaro, "Rachel Carson's Environmental Ethics," *Worldview* 6 (2002): 58-80.
- 25 Carson, "Design for Nature Writing," p. 95.
- 26 Lear, *Lost Woods*, p. xii.
- 27 Carson, *The Sense of Wonder*, p. 56.
- 28 It is important to pause here to notice how brave this was. When she insisted on the importance of feelings to the growth of knowledge, and when in her own writing, she combined emotion with science, Carson stood against the stiff wind of the Enlightenment and the scientists and ethicists who are its heirs. "For the Enlightenment, whatever does not conform to the rule of computation and utility is suspect," Horkheimer and Adorno warned. (Max Horkheimer and Theodor Adorno, *Dialectic of Enlightenment* [New York: Continuum, 1972]). To defend the significance of feelings was courageous, to do so as a woman was especially brave, and some of the response (to this "hysterical female") was predictably vile.
- 29 Carson, *The Sense of Wonder*, p. 55.
- 30 Carson, *The Sense of Wonder*, p. 69.
- 31 Carson, *The Sense of Wonder*, p. 83.

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