

Learning the Language of Fields and Forests

IN EACH of our lives, there is a time, and often a person, that sets us on our trajectory. At a time in my youth when I wanted to be both a poet and a biologist, those who were close to me—academic advisors, friends, parents—told me that I must choose between these two incompatible pursuits. Faced with this career choice between the arts and the sciences, my response was pure flight behavior: to withdraw from others, to walk for hours on end, and to read Thoreau. About that time, a friend offered me a retreat—a chicken coop that had been converted to a cabin. There I secluded myself, wrote, pored over biology texts, and read each morning from the journals of Thoreau.

That morning reading ritual was among the most precious I have ever performed. Each dawn, I would contemplate the passages that Thoreau had written on the very same calendrical day more than one hundred years before. As I worked at tasks through the morning, afternoon, and evening, Thoreau's words would burrow deeper and deeper into the soil of my soul, in much the same way as certain awned grass seeds twist and drill their way into the earth before germinating. Somehow, in some way, Thoreau altered my life then, for my course as field biologist *and* writer finally emerged out of those months of doubt and difficulty. Although it took sev-

eral more years of schooling in ecology, literature, and ethnobotany to clarify my course, I eventually settled down to study and write about seeds and their conservation in soils, gene banks, and cultures.

In retrospect, I see that I became anchored by the steadiness of Thoreau's voice and by his persistent faith in the natural order of the world. In reading his journals, I gained a sense of how one might integrate a scientist's skill for detailed observation with a poet's command of language. In Thoreau, I first encountered someone who saw no polarity between poetry and nature's economy, but instead envisioned a vast ecology that spans both and enriches our senses, our hearts, and our minds.

It is not surprising that I feel a special connection with this remarkable treatise, *The Dispersion of Seeds*—the book within the covers of *Faith in a Seed*. Yet this book, which has taken more than a century to reach publication, is remarkable not only because it strikes a personal chord but also because it conveys several important messages, not least of which is that Henry D. Thoreau did *not* choose between the arts and the sciences. Robert D. Richardson, Jr., who contributed the introduction to this book and who wrote *Henry Thoreau: A Life of the Mind*, has commented that Thoreau, Emerson, and their colleagues "recognized no 'two culture' split between literature and science; they believed that to study nature and to know oneself came at last to the same thing, which it was the purpose of literature to express." Accordingly, it can be argued that Thoreau began to rough out a literary ecology of North America, a work in progress that is still being shaped by dozens of landscape writers and literate biogeographers who are active today.

Fortunately, other talented individuals have followed in Thoreau's path to build ever-stronger bridges between ecology and literature—from Vladimir Nabokov, John Steinbeck, Loren Eiseley, and Archie Carr to David Ehrenfeld, Barbara Kingsolver, David Quammen, Jean Craighead George, and Robert Michael Pyle. They have written creatively about the

cryptic creatures, hidden habitats, and natural curiosities that they have encountered in their work as biologists and have enriched us all by exposing us to these seldom-seen universes.

It is ironic that Thoreau's involvement in purely scientific inquiry has been ignored for so long by so many and pooh-poohed by the few scholars of American literature who were familiar with this hitherto unpublished work. In the years between the publication of *Walden* and his death, Thoreau's four thousand or so journal pages and his unfinished "Kalendar," or "Book of Concord," were devoted primarily to detailed observations of local natural history. Literary critics have never been captivated by these digressions into "technical writing." For example, Odell Shepard, editor of *The Heart of Thoreau's Journals*, considered Henry's seedy inquiries to be a chapter of his lifework best left unpublished. According to Shepard, Thoreau's journals after 1857 wallowed in parochial and pedantic preoccupations: "From this point in the Journals, to the end, we watch the gradual conquest of the thinker and poet in Thoreau by the observer. The 'views as wide as heaven' are being 'narrowed down to the microscope' as he had feared. . . ."

Although always committed to broadening his biological knowledge, Thoreau occasionally worried about whether this immersion in science would take a toll on his art. In 1851 he asked, "What sort of science is that which enriches the understanding but robs the imagination?" Still, he proceeded over the next decade to hone his skills as a scientific observer, to inject more precision and authority into his work. In 1852, when he received an edition of Asa Gray's *Manual of Botany*, Thoreau finally had in his hands the tool that would help him probe the composition of the local forests. And early in 1860, when he acquired a copy of Darwin's *On the Origin of Species*, he at last had an overview of evolution and natural selection that provided an authoritative context for his observations.

In much the same way that literary critics have dismissed the quality of

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Thoreau's later scientific writing, botanical and zoological taxonomists have maligned his early attempts at plant and animal study. Modern scientists have largely ignored the fact that he did not have reliable keys to the flora and fauna of North America until the last decade of his life—hence, most of his early misidentifications of biota are excusable. Even so, taxonomy was never his forte, a “failing” that has inspired certain botanical historians such as Ray Angelo—in his *Botanical Index to the Journal of Henry David Thoreau*—to chide Thoreau for not being able to distinguish poison ivy from poison sumac and for not knowing that only one species of spruce grew in Concord. Other scientists familiar with Thoreau's writings have also noted that his field identifications of common plants and animals generally left something to be desired.

But they miss the point, for they judge Thoreau as a biologist solely on the basis of his lackluster skills in taxonomy while underestimating his remarkably acute ecological insights into plant-animal interactions. Indeed, we learn from his treatise *The Dispersion of Seeds* that Thoreau was the first Anglo-American field ecologist to be influenced by Darwin's theory of natural selection and adaptation. Thoreau's writings between 1856 and 1861, which were shaped not only by Darwin's works but also by those of pre-Darwinian theorists, clearly anticipate issues in plant population biology and coevolution that did not become fully articulated in evolutionary ecology until the early 1970s. He launched inquiries into numerous topics—the demographic consequences of seed dispersal by adhesion to animal fur, deposition by birds, ingestion and defecation by mammals, and transport by wind and water—that remain vital areas of interest to evolutionary ecologists. His observations on dispersal distances of fleshy fruits carried by animals remain important a century and a half later for their precision and anticipation of plant-animal mutualism arguments.

Although the theory of natural selection had dawned on both Charles Darwin and Alfred Russel Wallace during their travels in tropical archipelagoes quite distant from the temperate forests, Thoreau realized that

their principles should be as evident in his local community as they were in exotic lands. In studying the evolutionary adaptations characteristic of various seed dispersal syndromes evident right around his home, Thoreau was far ahead of his time. For several more decades, biologists who investigated seed movement simply accumulated anecdotes about extreme cases of long-distance dispersal by trade winds, migratory waterfowl, or floating rafts of vegetation. Such anecdotes considered only the heroic anomaly—the one seed in a billion that lands on a distant island to colonize a newly formed lava flow. In contrast, Thoreau's approach included testing hypotheses, carrying out field experiments, quantifying data, and confirming empirically that bird *B* did indeed disperse fruit *C* to place *A*. His inquiries more reasonably explained the fate of 99 percent of the seeds that are dispersed no more than a couple hundred yards from their mother plants.

The result of this painstaking work was that Thoreau gradually elucidated most of the dominant patterns of seed dispersal and tree seedling recruitment within an afternoon's walk of his home. He deduced these patterns by way of ingenious inferences; by measuring the distances between trees of the same species; by counting, weighing, or floating certain seeds; by noticing which accumulate in windrows, ruts, and animal burrows; and by observing how far nesting birds and mammalian residents could carry the fruits around his neighborhood. His particularist approach to community ecology—a thoroughly modern one by today's standards—offered him more than enough to study in his own backyard: "I shall never find in the wilds of Labrador any greater wildness than in some recess of Concord."

In 1856, while in the midst of researching his essays on seed dispersal and forest succession, Thoreau met Walt Whitman. Whitman spoke to him as a representative of the American soil, as a voice of what is native and unique to his home ground. Within a year's time, such metaphors had infused Thoreau's botanical pursuits:

If a man is rich and strong anywhere, it must be on his native soil. Here I have been these forty years of learning the language of these fields that I may better express myself. If I should travel to the prairies, I should much less understand them, and my past life would serve me but ill to describe them. Many a weed here stands for more of life to me than the big trees of California would if I should go there.

Thoreau became obsessed with "learning the language of these fields" in the years just prior to his death. For him, the forest was a book waiting to be read: one simply had to devote sufficient time to grasp its grammar, to learn the rhythms of its syntax. His faith in natural order made him believe that there was a deep structure to all vegetational patterns that could be ascertained by any diligent student.

It is amazing how far Thoreau went beyond taking mere snapshots of the forest that stood before his eyes to explore the processes that led to its regeneration. More than any other botanist of his time, Thoreau moved past the mere naming of trees—the nouns of the forest—to track its verbs: the birds, rodents, and insects that pollinate flowers or disperse seeds, and all the other agents that shape the forest's structure.

It is a difficult language to learn. As ecologist Henry Howe conceded in 1986,

plants have an ancient and uneasy relationship with vertebrate animals which eat their fruits, and either digest or disperse their seeds. . . . In contemporary forests, as many as 45 to 90 percent of the tree species bear fleshy fruits apparently evolved for consumption by birds and mammals. [And yet], given the prevalence of seed dispersal by animals, it is puzzling that neither the advantages of seed dissemination to the plant nor the means to bring it about are well understood.

Thoreau's dedication to the task of learning the language of the forest is humbling. He knew Concord's forests like the back of his hand. Daily walks, years of land surveying, and communication with other local nat-

uralists enabled him to know the distances between every new patch of tree seedlings and the nearest sexually mature tree of the same species. Yet despite his detailed knowledge of the local landscape, Thoreau was ultimately attracted to this field of inquiry because it was so full of the unexpected: "Though I do not believe that a plant will spring up where no seed has been, I have great faith in a seed. Convince me that you have a seed there, and I am prepared to expect wonders."

"The very earth itself is a granary," Thoreau concluded. What Thoreau the ecologist may have lacked in training and technology he made up for in his capacity for protracted attention to the land's dynamics and in his considerable talent for metaphorical thinking. The loveliest passages in his treatise on seeds are those in which his deep reservoir of literary knowledge wells up into his science. In them we experience the precision and grace with which he encounters the earth:

Touch-me-not seed vessels, as all know, go off like pistols on the slightest touch, and so suddenly and energetically that they always startle you, though you are expecting it. They shoot their seed like shot. They even explode in my hat as I am bringing them home.

Look under a nut tree a month after the nuts have fallen. . . . The ground looks like a platform before a grocery, where the gossips of the village sit and crack nuts and less savory jokes. You have come, you would say, after the feast was over, and are presented with the shells only.

The scales of all our birch cones are three lobed, like a typical spearhead . . . but those of this species are peculiarly interesting, having the exact form of stately birds with outspread wings, especially of hawks sailing steadily over the fields, and they never fail to remind me of them when I see them under my feet.

It was on the wings of seeds that Thoreau sailed home, where he found peace before he died. Although often itching to travel to the far reaches of the world, and always cosmopolitan in his readings, Thoreau gradually

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became convinced that what he could learn closest to home was what was ultimately of the greatest value. If literary historians sense that he had ceased to emulate Wordsworth and Goethe in his poetry and lofty philosophical essays, they misread his intentions. Instead of turning his back on these literary traditions, Thoreau tried to incorporate them into his search for a language more difficult but more enduring: the language of the forest itself.

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