

Biology Today

Naturalists

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Department Editor

My last two columns have been devoted to molecular biology, which, I again confess, is my favorite branch of biology. However, my recent reading has re-awakened in me an interest in Nature originally sparked when I was a high school freshman. The homework assignment for spring vacation was to “notice the signs of spring around you.” Everything seemed much more alive and fascinating that spring, but, unfortunately, my interest wasn’t intense enough to be self-sustaining, and my teachers in later years were more concerned with pounding the phyla into my head than with getting me to experience the intricate beauty of living things. Lately I’ve been making up for lost time by reading the works of naturalists.

The book that really got me hooked on natural history is *The Outermost House—A Year on the Great Beach of Cape Cod* by Henry Beston. Last year I was visiting Cape Cod for the first time and I wanted to learn something about the area, so I picked up a paperback copy of this 1928 classic. For one year, Beston lived alone in a two-room cabin on the dunes of Cape Cod’s outer beach facing the Atlantic. This was a relatively unpopulated area in the 1920s, even in the summer, so Beston had direct and relatively uninterrupted contact with Nature. Being alone, he had the time not only to observe carefully, but to reflect

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on what he observed. And, fortunately for us, he had the ability to convey his observations and musings to his readers in beautiful prose. He noted changes in the sea and in the creatures that depend on the sea for life—migrating birds, maritime locusts, swarming amphipods. And he described what seems to me to be the essence of natural history and the goal of the naturalist:

To be able to see and study undisturbed the processes of nature—I like better the old Biblical phrase “mighty works”—is an opportunity for which any man might well feel reverent gratitude, and here at last, in this silence and isolation of winter, a whole region was mine whose innermost natural life might shape itself to its ancient courses without the hindrance and interferences of man.

A naturalist can be defined as someone who studies animals or plants, usually at a nontechnical or even an amateur level. But the more I’ve read, the harder I find it to define the breed. Some are ob-

viously amateurs while others have dedicated their lives to the study of the life around them. But what all naturalists have in common is a love of Nature. As Alan Ternes, editor of *Natural History*, says in an introduction to a collection of articles from that magazine (*Ants, Indians, and Little Dinosaurs*): “Naturalists may attempt to achieve a scientific objectivity toward the creatures they study, but fortunately for editors they fail.”

There have probably been naturalists around as long as there have been human beings; the caves of Lacaux attest to that fact. Humans have wondered about Nature even as they tried to control it. That has certainly been true of the development of the New World, though the contemplation and the controlling weren’t necessarily done by the same people. *A Species of Eternity* by Joseph Kastner is a history of naturalists in America during the 18th century and the first half of the 19th, or more accurately, it is a history of the United States from the naturalist’s perspective. Drawing on the writings of these naturalists, Kastner portrays the biological richness and abundance of this continent before civilization tamed it. These men could reach wilderness simply by walking out of Philadelphia, the center of natural history at the time.

Kastner describes Charles Wilson

Peale's natural history museum in Philadelphia, and how he organized the country's first paleontological dig. He also recounts Lewis and Clark's trek west and the wanderings of Audubon. He introduces other naturalists who are less well known, at least to me—Alexander Wilson, Audubon's predecessor in bird portraiture; Constantine Rafinesque, a genius at identifying new species; Thomas Nuttall, an absentminded, but brilliant, botanist. Toward the end of the book, Kastner discusses "The Closet Botanists," John Torrey of Columbia University and Asa Gray of Harvard. They did not collect specimens for themselves, but instead studied the results of other collectors' labors. By 1850, the era of freewheeling naturalists who considered the entire country their field of study had come to an end.

Kastner is saddened by the end of this era of bounty and freedom, but it was inevitable that naturalists would change as the country changed. That doesn't mean, however, that naturalists aren't still roaming the land. It's just that their training and approaches are different; they are more likely to fly or drive now, rather than to tramp over long distances on foot. Botanist May Theilgaard Watts traveled by plane, train, and car to gather information for *Reading the Landscape of America*, which depicts the different ecosystems within the United States. But Watts doesn't just describe a particular bog or river valley or forest; she tells how and why it slowly got to be that way; how fires, glaciers, or man have affected its development; and what changes can be expected in the future. She walks across dunes and shows how wind ordains not only the contours of the landscape, but what type of vegetation will grow there. She does, literally, read the landscape, and what makes her book so fascinating is that she derives so much information from what she reads. She can even read in the dark! In one essay, she

describes the changing silhouettes on a night train ride from Chicago to Denver.

A major asset of Watts' book is that in many cases she revisits areas she had explored perhaps 20 years before. In some, she finds few changes except those wrought by natural forces. In others, the effect of man's hand has been tremendous. Drainage can change a bog and split-level homes can alter dunes with a speed that Nature cannot imitate. Aldo Leopold presents the same theme in *A Sand County Almanac*. Though originally published in 1949, a year after Leopold's death, it could easily have been written during the height of the ecology movement in the 1970s. The dangers that Leopold saw have only intensified with time. But I can't say that I enjoyed this book, though his descriptions are vivid and full of love. Perhaps it wasn't meant to be enjoyable, but to disturb, to act as a spur to action, as Rachel Carson's *Silent Spring* did in the 1960s. But it seems to me that *A Species of Eternity*, without ever hammering home the point, made the best case for preserving our environment by describing the abundance and variety that existed almost everywhere in this country 200 years ago.

Few places in the United States have been altered so profoundly as New York City, my home. Wall Street originally got its name from the barrier erected there to keep out the wilderness that extended northward over the rest of Manhattan Island. In the 1700s, going to Harlem was visiting the country, and it took a day to get there and back from lower Manhattan. (Of course, it can still take a day if the Lexington Avenue subway breaks down!) John Kiernan's *A Natural History of New York City* contains many such intriguing facts about New York. He writes that minks still occasionally wander down to the Bronx from the more rural areas of the state, and that this borough

also harbors the city's last stand of virgin forest. Most of the book is a catalogue of the plants and animals to be found within the city's limits. This can become tedious at times, but it does give an idea of the surprising variety of organisms that can adapt to so altered an environment. It also made me want to help preserve what is left, to keep New York as biologically rich as possible.

All naturalists are careful observers. Things catch their eye that are completely missed by the untrained observer. Most of us don't have the patience—and patience seems to be the key ingredient—to sit still and let Nature tell us secrets at its own pace. *Curious Naturalists* by Nikolaas Tinbergen is full of the fruits of careful observation. Tinbergen won the Nobel Prize in 1973 along with Karl von Frisch and Konrad Lorenz for their work on animal behavior. He has followed many lines of research, most of them dealing with insects and birds. He describes how he decided to study animal behavior when, as an aimless zoology student, he started to observe the habits of the digger wasp, *Philanthus*, while on summer vacation. From there he went on to work with Snow Buntings, sand wasps, Graylings, Kittiwakes, and Black-headed Gulls. In each case, he devised simple, but ingenious and fruitful, experiments to dissect complex behaviors and determine what triggers various responses in these animals. He went far beyond simple observation of animals in their environments; he manipulated those environments to get at least partial answers to such questions as how do animals home, and what triggers mating behaviors. Tinbergen and others like him prove that, while natural history may be nontechnical, it nonetheless can yield scientifically sound results.

Other naturalists observe rather than manipulate, but that doesn't mean that we can't learn a great deal from their work. There are

dozens of these individuals who have committed their careful observations to writing and have thus enriched both our intellects and our spirits. As Loren Eiseley, himself a writer and naturalist, mused in *The Night Country*:

... one feels at times that the great nature essayists had more individual perception than their scientific contemporaries. . . . The world of nature, once seen through the eye of genius, is never seen in quite the same manner afterward. A dimension has been added, something that lies beyond the careful analyses of professional biology.

There are many writers who have seen the soul of man in Nature, who have deepened our appreciation for the life around us and for our own humanness as well. Thoreau, of course, is one. Eiseley himself, in such books as *The Immense Journey*, is another, though I find his writing a bit florid. And a more recent addition to this literature is Peter Mathiessen's *The Snow Leopard*, an account of his journey through the Himalayas. But for prose of poetic beauty I don't think anyone could improve on the writing found in *Travels*, William Bartrams' journal of his four-year trip (1773-1777) through the Carolinas, Georgia, and Florida.

One of my new favorites is an old book that was recently returned to print. It's *The Desert* by John C. Van Dyke. In the last years of the 19th century, Van Dyke, a professor of art history, roamed the deserts of the Southwest. He recorded not only what he observed, but his thoughts and emotions as well, as he ranged over one of the most daunting of ecosystems. I've never visited desert country, but if I do, I'll appreciate the experience much more because of Van Dyke's writing. I'll feel the desert's atmosphere more acutely and observe its life more carefully.

As I experience the desert with Van Dyke or Cape Cod with Beston and John Hay (*The Great Beach*) or the sea with Rachel Carson (*The Sea*

Around Us), my only regret is that I didn't discover the joys of natural history sooner. Now that I have discovered Nature, I want everyone to be so blessed! I don't want my students to have to wait until they're middle-aged for the light to dawn on them. Most of my students are nonscience majors; their lives are not going to be dedicated to science, and many of them come to me with a definite prejudice against science. Talking to some of them makes C.P. Snow's two cultures look very real.

If their interest in Nature could be sparked, as mine was, then perhaps they would want to know more, rather than being coerced into learning more. There is a national outcry at the moment about the poor level of science education for those not training to be scientists. I think that one way to overcome this problem is to make ourselves into a nation of naturalists. Since many naturalists are amateurs, anyone can join their ranks. And as people become more aware of the life around them, they may begin asking questions about how this life developed, why animals behave as they do, or why plants grow where they do. They may begin to wonder at how organisms respire and photosynthesize and reproduce. They may come to the study of science willingly, rather than reluctantly. Not only would our problem of scientific literacy wane, but the goal of preserving the environment might prosper.

This isn't a far-fetched idea. Many of the great naturalists of the past were amateurs. Theodore Zeldin in *France: 1848-1945* observes that:

In the eighteenth century, the study of science was a common hobby among educated men of leisure A list has been compiled of nearly 500 people known to have had *cabinets d'histoire naturelle*—aristocrats, priests, actors, collectors of taxes, factory inspectors, and the duc d'Orleans's chief cook.

Many of the early naturalists in this country were clergymen (John

Banister, the New World's first resident naturalist), politicians (Samuel Latham Mitchill, whom Jefferson called "the Congressional Dictionary"), and military men (John Charles Fremont, the "pathfinder of the West").

I think it's possible to renew this trend with the help of the books I've discussed as well as a host of others. It's conceivable that an ever-larger portion of the population can experience Nature and feel what John Kirk Townsend, a physician and pharmacist, described in 1834:

None but a naturalist can appreciate a naturalist's feeling—his delight amounting to ecstasy—when a specimen he has never before seen meets his eye, and the sorrow and grief which he feels when he is compelled to tear himself away from a spot abounding with all he has anxiously and unremittingly sought for.

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