

## **Natural History: Beginning With the Particular**

*Commencement address for Graduates of the Natural History Education Program*

*The Morton Arboretum, November 2007.*

*Andrew Hipp (ahipp@mortonarb.org)*

I looked up “natural history” in Wikipedia two days ago. The first sentence of the entry reads: “Natural history is the scientific research of plants or animals, usually leaning toward the observational rather than the experimental, and encompasses more research that is published in magazines than in academic journals.” A few paragraphs down: “[Natural history] has historically been a haphazard study, description, and classification of natural objects, such as animals, plants, minerals, and placed an importance and significance on fieldwork rather than lab work.” This description does not jive with my experiences as a naturalist, either as a natural history educator or as a taxonomist. It belies the precision that the naturalists I’ve learned so much from demanded of themselves and others, people who can recall to within a few days and to the very shrub where and when they saw the first of each of the hundreds of bird species they know. Whether we pursue natural history as bird watchers, botanists, artists, laboratory scientists, horticulturalists, natural history educators, or readers of the landscape for any reason, we are engaged in the serious and delightful business of discerning how the world is put together, piece by piece. This is what I’d like to talk about tonight.

In 1994 I had just graduated with a Bachelor’s degree in English and Creative Writing. Nearing graduation, I had applied for an internship at the Apostle Islands National Lakeshore. The funding didn’t come through for the internship, but Julie Van Stappen, the ecologist up at the Islands, advised me to bid on a contract to verify a set of vegetation maps for the Park. This job I was pretty sure I could do as well as anyone, but only if I spent a lot of time preparing. I really wanted the job. I asked Julie how much I should bid, and she said of course that she couldn’t advise a potential contractor on how to bid. I figured I needed food for six weeks—that was about \$200—and enough money for a security deposit on an apartment and the first month’s rent—say, \$350 each—plus a little extra. I asked her if \$1,200 for the estimated six weeks of work would be too high, and she told me she suspected I wouldn’t necessarily be bidding myself out of the running. I got the job.

The work was just what I had hoped it would be. I was outside for about 80% of my waking hours, orienteering around the interior of the islands by map and compass, cruising from island to

island on the little park service boat. I got to crawl across the dense thicket of yew that carpets Raspberry Island, explore perched bogs on Stockton Island, pick raspberries on the bluffs of Outer Island, come across turkey vulture babies and saw whet owls in the woods. The copper-colored yellow birches reflected the light of the shaded swamps, and from every one I passed I broke off a branch to smell the wintergreen. I didn't have time to get tired of anything out there. Every afternoon, as sun was coming down and I was anxious to get back to camp before I was lost for the night, I'd crash through the woods back toward the edge of the island, and I often had the experience of watching a spider sensing my approach and scampering to the edge of her web just in the nick of time before I broke through it. At night, I'd read or talk with the campground host. On Outer Island, I would watch the big boats gliding along in the darkness from my cot, and in the morning I would watch the sunrise from the lighthouse.

My last trip of the contract was to Long Island, where I spent seven days. The lodgings were the least commodious of any of the Islands—a small shack that looked as though it might slip into Lake Superior in the next storm—but that was more than compensated for by the solitude. There was no one else on the island, which was small, simple, and beautiful: a slender, finger-like sand peninsula arching out from the mainland, continually building up on the one side and eroding away on the other. The island's genesis and continuing evolution patterned the vegetation in long bands that ran approximately parallel to the axis of the island, alternating bog and stunted forest. They were eroded off obliquely at the lake edge, so that walking the shoreline, you'd cross the stripes of vegetation in succession. I sampled quadrats from sunup to dusk every day, stopping to eat lunch at the edge of Lake Superior. At night, I keyed out plants in the shack, at a little dinner table under a gas light. There was enough propane left at the end of the season for tea and oatmeal and light in the evenings, and those were the things I wanted. I had brought along a copy of Norman Fassett's guide to the grasses of Wisconsin, and I started to learn the structures and taxonomy of grasses in the evenings with a hand lens. I was taken with grasses, and thrilled at navigating the structures. I loved the vocabulary: lemma, palea, glume, ligule, awn, rachilla, culm. I loved the plants: they were beautiful, like dancers or animated line drawings. I made a labeled collection of grasses for my wife Rachel (girlfriend at that time), mounted them on herbarium sheets I had snuck from the park service herbarium, using Elmer's glue applied painstakingly with a toothpick, and I had no doubts that she would love it as much as I did. (She did.)

Fassett turned out to be an ideal guide into the grasses and into my life as a naturalist and botanist. Listen to these words from the introduction to his book, buried within the orientation he provides to the grass body as a whole:

Different arrangements of spikelets; such details as size, shape, texture, armature, veining, pubescence, and relative lengths of glumes, lemmas, and paleas; number and relative size of florets in a spikelet—these supply the different combinations of characters that are most important in distinguishing the some 204 species of grass found in Wisconsin, and indeed, the hundreds of grasses of the world.

So characteristic is the nature of the spikelet of each species that agrostologists have confined their attention almost entirely to that structure. Actually, other organs might also be used for identification. We are accustomed to recognizing our friends by their faces, but were it our custom always to cover our faces we might nearly as well learn to recognize persons by their hands. It is said that detectives sometimes learn to recognize a person by his ears, for ears cannot be as easily disguised as can faces and actually have as much individuality. The most practical method of positive identification of persons is not by their familiar faces but by their fingerprints. Just as positive, but less commonly used, is identification by the pattern of the blood vessels in the eye.

So it is with plants.

Natural history, like fiction or poetry, is truth by way of the particular. An old fencerow tells as important an aspect of the history of a farm as an oral history. An owl pellet is glimpse into the natural history of the forest at night. I hadn't been so fully aware of these things before. The finest detail, seemingly irrelevant, rarely is.

At the same time—the very same week and the same island—I gained my introduction to the study of organic evolution. Oddly enough, it was by way of a well known book by the Catholic

anthropologist Teilhard de Chardin. Theology may not seem a natural passage to the study of descent with modification, but I think it's the only door I could have gone through at the time. I wrote Rachel and asked her to find me a copy of Chardin's *The Human Phenomenon* and send it to the Apostles, which she did. Here are the first words I read:

*Seeing.* We might say that the whole of life lies in that verb—if not ultimately, at least essentially. Fuller being is closer union: such is the kernel and conclusion of this book. But let us emphasize the point: union increases only through an increase in consciousness, that is to say in vision. And that, doubtless, is why the history of the living world can be summarized as the elaboration of ever more perfect eyes within a cosmos in which there is always something more to be seen. After all, do we not judge the perfection of an animal, or the supremacy of a thinking being, by the penetration and synthetic power of their gaze? To try to see more and better is not a matter of whim or curiosity or self-indulgence. *To see or to perish* is the very condition laid upon everything that makes up the universe, by reason of the mysterious gift of existence. And this, in superior measure, is man's condition.

I won't pretend that this was the beginning of my work as a naturalist. That had started when I was a kid in Wauwatosa, biking around Menominee River and tearing around the Northwoods in Boy Scouts. But those few weeks in the Apostle Islands, and especially that week on Long Island, frame my entire professional trajectory.

From the Apostle Islands I took a job as the ranger and naturalist at the University of Wisconsin–Madison Arboretum. It was great work. I was making good money—\$8.50 an hour, with a raise to \$8.76 after only two years—and the job was exactly what I wanted to do with my time: walk around the woods and prairies, chip trails, lead natural history walks, write. I was also working as a naturalist at a preschool a few hours a week, and I spent a lot of time thinking about what a natural history educator should accomplish. I tried, at least once, many of the things I saw

other naturalists do: activities, songs, stories, brisk walking and slow walking, loud talking and soft talking, games. Very quickly, I settled into a groove of my own that I suspect is familiar to almost every naturalist. I would take the students away from the bus or parking lot as quickly as I could and just walk, until I found a place I wanted to look at myself, and then we'd look at it and see what we saw. We'd move on, and keep doing this until we were out of time, and somehow that always happened just about the time we were back to the parking lot. That's all there was to it. It was the purest, nicest teaching I can imagine. It was like writing a poem or improvising music. It was practicing the habit of seeing, but with other people.

Being on staff committed me to what seems in retrospect an inordinate volume of staff meetings. We were constantly rehashing our interpretation and teaching philosophy, refining what we were trying to get across to visitors. It was laborious, but it was great for me, and I never tired of these conversations. The most persistent question was why the Arboretum should be teaching basic natural history at all when its mission was ecological restoration. Shouldn't we just get people out doing restoration? This attitude bugged me, but I don't know whether I could have articulated clearly why. Then, in one of these meetings, Virginia Kline, who was the ecologist at the Arboretum for 20 years, handed us the reason. Look at how *A Sand County Almanac* is written, she said. The book starts with natural history, then works its way to philosophy. Think of the first paragraph:

Each year, after the midwinter blizzards, there comes a night of thaw when the tinkle of dripping water is heard in the land. It brings strange stirrings, not only to creatures abed for the night, but to some who have been asleep for the winter. The hibernating skunk, curled up in his deep den, uncurls himself and ventures forth to prowl the wet world, dragging his belly in the snow. His track marks one of the earliest datable events in that cycle of beginnings and ceasings which we call a year.

The track is likely to display an indifference to mundane affairs uncommon at other seasons; it leads straight across-country, as if its maker had hitched his wagon to a star and dropped the reins. I

follow, curious to deduce his state of mind and appetite, and destination if any.

Think of the essays that populate Part I of Leopold's book. "Good Oak." "Draba." "Axe-in-hand." "65290." The essays all begin at a specific place or with a particular species or with, in the case of the last essay, a particular chickadee, banded in 1937 and followed through the years. This strikes me as being absolutely correct: you can't get to generalities until you know the particulars. When I watched the naturalists I really liked, it certainly held. I had had the good fortune to fall in with a group of smart, older naturalists who met every Thursday evening under the name "Friends of Little Bluestem" to botanize, birdwatch, look for insects, and study the landscape, then get supper. When I watched these older naturalists teach, it was the particular that drove them down the trail. And when I would hear stories about the great naturalists who had worked in the area, always it was about specific things they had done. Jim Zimmerman, they said, would spend two hours and never get the group farther than the edge of the prairie, not from lecturing but from looking, and describing what he was seeing. My experience with students of all ages was the same. There always enough to do if there was something to look at, and there was always something to look at. None of us has seen enough that we should switch over from the particular to the general. To paraphrase Ernst Mayr on the subject of systematics: the views of a naturalist are directly tied to the amount of material he or she has looked at.

I'd like to propose an analogy between the study of natural history and the business of writing fiction. Natural history shares with fiction writing the first task of making sharp and particular observations about the world and its interactions, and then reporting them. In both fields, the first goal is to perceive clearly and precisely. Flannery O'Connor herself took up painting as a student at University of Iowa precisely because it sharpened her eye. And the difficult task in both fields is to do more than just accurately see and describe the world, but to discern which particulars will give us the most insight into how the world works. In both endeavors, the route to truth is by way of the particular. Ethics and metaphysics enter into a story by way of the characters and situations. They may be in the author's mind at the outset, but they show up in his or her story as the movement of a character's hand in a sink full of dishes, or a misplaced comment in the grocery store. The fiction writer as fiction writer is concerned with the plight of his or her characters and

perhaps with their philosophy, but not foremost with his or her own theories about how the world works. In the same way, the first interest of the naturalist is with the particulars of the world around us, not our theories about how it works.

Of course this distinction between the particular and theories about the particular—the distinction between the first section of *A Sand County Almanac* and the last—cannot be used to draw a line between disciplines, between natural history and science, along the lines of the unsatisfying distinction presented in the Wikipedia entry I quoted at the beginning of this talk. Just as the writer chews on philosophy but creates fiction, the natural historian draws on ecology, evolutionary theory, taxonomy, anatomy, cellular biology, geology, climatology, and a host of other fields as the backdrop for his or her observations. Humans don't get to make theory-neutral observations, at least humans that are older than a day or so. And accumulated observation tends to lead to generalization. Thus, scientists, even lab scientists or theoreticians, depend on natural history as the source for the concepts and phenomena that they go about studying. Darwin, in *The Origin of Species*, depended on the natural history of wild and domesticated organisms to make his argument regarding the process of biological evolution, which in the end is the most fundamental unifying theory of biological science. No scientist can work effectively without also being in part a natural historian, and no natural historian can do without also being a scientist. The distinction between the two becomes increasingly blurry with closer inspection, and in the end, it is not clear that the distinction is at all real.

I love the field of natural history in all its permutations, and it has been an honor to be able to speak with you tonight about it. Whether you are going on to practice natural history as an educator, as an illustrator or photographer, as a horticulturalist, or as a botanist or ornithologist or entomologist or landscape-interpreter for any reason, you are in an exciting field, one that is full of potential. Congratulations to you on your accomplishments and your successful completion of the certificate program. Thank you.