Between Stones and Trees
An Ecologist Hikes Western Pennsylvania

Essay:

"Do We Need Nature"

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"Do We Need Nature?"

A previous version of this essay was the Bronze Medal winner in the 2003 Economist/Shell Writing Competition.

"Do we need nature?"

I am sitting on a damp beech log in the middle of a small piece of long used Pennsylvania forest. I am writing in a spiral ringed notebook with a black, felt tipped pen. The ink flows smoothly into crisp, narrow lines of the letters, but the cool, humid air and the occasional drip from the overhanging tree branches makes the words smear and run on the page. For the past three years I have explored, observed, described and written about this unremarkable, four acre rectangle. Its commonness continuously gives me hope and renewal.

The soil beneath my feet has a plow layer that may date back to the late 1700's. Veterans from the Revolutionary War cleared off the site's ancient oak forest as they tried to work their government land allotments into corn fields. Some of the felled trees were used to build cabins and barns, some were used to heat the cabins and cook the food, but most were burned in great slash piles. The rivers ran gray with all of the ash. In the middle of the Nineteenth Century, the partially re-grown forest was clear-cut and cooked into charcoal that was used to fuel crude iron furnaces. And, ninety years later, the tertiary oaks that had eventually reclaimed this site were cut again. These trees were used to build the houses that began to crowd the streets of the near-by towns. The trees around me now are dominated by the 70 and 80 year old offspring from the four, great white oaks that survived the second logging. Yellow poplar and white ash are intermixed with the oaks on the well drained ridge, and a collage of beech and maple is growing in the wetter lowlands. This patchwork of upland and lowland forest is stitched together by a dense shrub layer of raspberry, spice bush, and wild rose. Jack in the pulpit, trillium, wild geranium, Mayapple, and more grow in the gaps around the shrubs. Deer, gray squirrel, and turkey are abundant in the rich thicket.

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Down the slope a small, seasonal stream flows along the southeast edge of the site. It runs only if there has been sufficient rainfall to charge the ground flow from its seeps. It has been a very wet spring, and I can hear the water pouring over and around the rocks that congest the ravine. This stream eventually gets a name and then flows via a concrete culvert into the Allegheny River. The Allegheny then runs toward the Gulf of Mexico through the Ohio and Mississippi Rivers. Cities and towns and mills and factories along the way take millions of gallons a day for drinking water and other uses. It could take decades for this water to reach the sea.

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Ten years ago I set out to observe, describe and understand this small piece of Pennsylvania. My students and I mapped every dip and hole, slant and slope of the place. We measured, aged, and located all of the trees on the site and developed our models of succession and re-growth. We mapped the distribution of spice bush and noted differences in the locations and energy needs of male and female plants. We mapped the distribution of raspberry canes and related them to the web of the deer trails that crisscrossed the area. We measured the wild grape vines that were parasitizing so many of the site's trees and related their mass and degree of infestation to specific tree species and specific sizes and combinations of surrounding shrubs. We studied the vegetational succession going on in the soil holes left by wind thrown trees. We watched and measured new tree growth in the light gaps formed by the fallen trees. We tracked red fox, raccoon, deer, and turkey through different sub-habitats of the site. We found pileated woodpeckers living quietly (for them) in

sculpted holes high in the trees along the stream. We found six foot long black snakes and six inch long box turtles at unexpected times and in unexpected places. We found American toads sitting like kings in palaces of old logs and damp leaves.

We documented as much of this site as we could and constructed a web site on which to record it. Many thousands of hours of observation and attention is a conservative estimate of the time invested by so many of us as we tried to "see" this tiny, plain piece of nature. We have photographed, measured, identified, and described thirty-five species of trees, many scores of species of wild flowers, fungi, and ferns, dozens of species of birds and mammals, and hundreds of different invertebrates. I have written essays describing the processes in which the species are participating. I have tried to put all that we have seen into an intellectual and scientific and also an emotional context. But, in spite of our intense scrutiny, each season, almost each week, we see something new. Our awareness of our surroundings and their complexity grows with each minute of invested time.

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I frequently give talks along the trail that we have cut through our four acres. I have taken hundreds of college students, grade school students, boy and girl scouts, business executives, fellow faculty, alumni, and university administrators out onto our trail. Just last week, I took a group of 20, fifteen year old girls for a nature walk. The girls were attending a science and technology camp on our campus and had only passing interest in things not related to engineering or eventually getting a job. I never plan what I will talk about on any of these tours but instead react to whatever the trail is featuring on that particular day. Sometimes we see animals, sometimes we see flowers or fungi, and sometimes we see very little but the trees themselves. Last week, Mayapple was in full bloom. Its broad, strikingly white flowers were open under the wide, dark green umbrellas of their leaves. Years ago, I explained to the girls, a chemical was isolated from the roots of Mayapple: podophyllin. Podophyllin is used, among other things, to treat venereal warts. The virus that causes venereal warts is the human papillomavirus (HPV). HPV also can cause cervical cancer. Worldwide there are over 300,000 new cases of cervical cancer diagnosed each year. Before the development of vaccines against HPV, podophyllin was one of the only tools available to fight against it. Other more recent isolations from Mayapple are being used to treat leukemia and other cancers. In the silly "umbrella" plant spreading out through our forest are an array of chemicals that represent real hope for many of our fellow humans. More than half of the girls were now listening to me closely! I led them through a dense tunnel of spice bush. The spice bush had flowered many weeks before and now was in full leaf. We picked leaves, smelled them, and chewed them savoring their spicy, cinnamon-like taste. I talked about the array of chemicals produced in the spice bush leaves, roots, bark, and berries that had varied uses in Native American traditions. Intestinal disorders, pain and fatigue, arthritis, fever, and colds were all treated by different combinations and preparations of the spice bush parts. Even more of the girls were now paying attention and some even began to ask questions. We then passed through a witch hazel thicket, and I talked about the topical astringent still made from the twigs and bark of the witch hazel. The woods, I explained, was a pharmacopoeia of untapped potential full of chemicals and applications just waiting to be discovered or to be remembered. We all then spent thirty minutes energetically looking for crayfish and salamanders in the stream. They went off to their robotics class with wonderful reluctance.

I am still sitting on my beech log. A light breeze is shifting through the tops of the surrounding trees making the branches rattle softly. A beetle flies struggling by. Its over-matched, membranous wings are vibrating in a blur out from under its heavy elytra. I take a sandwich out of my field jacket pocket and eat my lunch. I take a drink from my water bottle. Up on the ridge, a male titmouse whistles its high, repetitive song claiming the

area around me as his own. A bird I don't recognize is singing softly in the distance. A white footed mouse runs out onto the path. I toss him some crumbs of bread. He sits very still until I turn away. When I look back, the crumbs and the mouse have disappeared. On a small, rock-bound pool of the stream, a water strider inches its way across the plastic surface of the water.

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Not for everything. We have spent the better part of 10,000 years trying to insulate ourselves from nature. We don't need nature to love our fellow humans or to win the wars we fight. We don't need it to satisfy all of our comforts or for all of our entertainments. So much of what we do exists outside of its realm.

We do need nature, though, to repair the damage from our dreams and from our actions. That is the first lesson from these woods. This continuum of primordial forest, corn field, charcoal source, timber source, and teaching laboratory is a testament to the power of succession and repair.

We also need nature for its perspective on our existence. We need it for its timeless pauses. We need it for the miracle of the water strider and the improbability of the flying beetle. We need nature to surprise and amaze us. We need it to produce a chemical in one life form that has unexpected utility in another. We need it to feel the commonalities of all life that transcend mere enzymes and genes. We need nature for the song of the titmouse and its grandiose territorial ambitions. We need it for the unknown songs, too. We need nature for our sandwiches and our sips of water and for the little mice that eat our crumbs when we're not looking. We need nature to fill us up and reveal new things and ideas especially when we become omnisciently self-satisfied and smug in our false completeness. We need nature for its billions of years of possibilities and experiments. We need it to teach us how to survive. We need it for its peace and for its presence. We need it for its future, and we need it for its power of forgiveness.

"Do we need nature?"

What a question.