



It's a Jungle Up There

More Tales from the Treetops

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14 Global Citizens: An Environmental Ethic for Families

Consider two aspects of globalization: first, planes exploding as they slam into the World Trade Center, and second, the emission of carbon dioxide from the exhausts of gas-guzzling sport utility vehicles. One brought instant death and left unforgettable images that were watched on television screens all over the world; the other makes a contribution to climate change that can be detected only by scientific instruments. Yet both are indications of the way in which we are now one world, and the more subtle changes to which sport utility vehicle owners unintentionally contribute will almost certainly kill far more people than the highly visible one. When people in rich nations switch to vehicles that use more fuel than the cars they used to drive, they contribute to changes in the climate of Mozambique or Bangladesh — changes that may cause crops to fail, sea levels to rise, and tropical diseases to spread.

— Peter Singer, *One World: The Ethics of Globalization*

It is Mother's Day 2004. As I write this, eighteen such celebrations have come and gone in my short life as a parent. I wonder anxiously about the American moms who are in Iraq struggling to do battle on soils that are not home; their children must miss them. And what about the Iraqi moms who live in fear each and every day, wondering if their children will ever be safe? Considering the fate of these mothers, I recognize that my life has been spent in a very different battle — not one with imminent bloodshed, but one with slow, yet irreversible environmental degradation that will lead to great loss of life. The ecological battle is a subtle and insidious war, in which science education is one of the most powerful weapons. Yet most global citizens have not been educated about the workings of their environment or how to keep it healthy. Like the engine of an automobile, our global machinery — manifested in nutrient cycling, water flow, flowering, decay, bird migration, and other incredibly complex cycles — requires maintenance to keep it in working condition. Unlike auto maintenance, though, our ecosystems will operate well only if we leave a portion of them alone.

As a parent, I feel a strong biological instinct to keep these cycles intact and assure a safe and healthy home for my children and their children. As a scientist, I consider it a professional priority to detect problems and achieve solutions as an ecological steward of this planet. My children have developed their own ethics about caring for the world around them. One has integrated religion and science into a strong love of nature and will no doubt use that sensitivity to be a true steward of the natural world. The other wishes to go a step beyond his mother's detective work and engineer sound technology to solve the environmental threats to our quality of life. Suddenly my sons are at an age where I learn more from them than they learn from me.

My children are nearing the end of their teen years. At this writing, my elder son is as old as my longest-lived leaf, found in the Australian rain-forest understory. And who knows, perhaps some of its cohorts in different parts of that tree lived even longer. I wonder if a sassafras tree is cognizant of birthing and rearing a nineteen-year-old leaf. Actually, I do hope that trees experience some sense of maternal pride or appreciation of their progeny in their sylvan efforts.

Trees and mothers have a great deal in common. Trees are the heart of productivity of many ecosystems, just as mothers function as the biological center of birth and life. Like motherhood, trees provide energy and nutrients for their entire community. They provide sustenance. They provide shelter and stable homes for those around them. Most important, they quietly drive important functions that make all life possible in the surrounding ecosystem. Consider the amazing functions that trees perform: production of sugars from sunlight, transport of water over long distances, cycling of energy from the treetops down to the forest floor, prevention of soil erosion, filtration, provision of a home to biodiversity, cleansing of pollution from the air, and moderation of the harmful solar rays that would otherwise desiccate the forest floor. In the midst of this busy schedule of vital activities, trees produce their next generation without a fuss. I laugh when I contemplate the relatively trivial nature of human daily functions. We fret over the grocery list, dentist appointments, paying the mortgage, buying school supplies, or removing spam from our email accounts. In contrast, without fanfare, trees produce energy as the basis of all food chains on planet Earth.

On Mother's Day, I cannot help pondering my maternal contributions to my children's quality of life and comparing myself to the successful tree. If only I could have achieved as much as the tree! If I could have reduced pollution, saved biodiversity, found cures for diseases, reversed global warming, or conserved soils. But I have not. I have whittled away at relatively small goals in comparison to the grander accomplishments of a tree. Still, I hope that my personal achievements will strengthen conservation for the next generation. In my scientific role, I have managed to discover a few new species; pioneered some innovative approaches to forest ecology through canopy access; left a legacy of treetop walks encircling the globe to encourage ecotourism instead of chain saws; and talked to several million young

people—perhaps inspired a few—through distance learning. In my parental role, I have sought to connect my children to nature and to remind them that their health links directly to the environment, not the state of their computers or cell phones. Children and their parents need to understand that we are *part* of our ecosystem, not outside it.

Like most working parents, I wear two hats. In my case, I am a parent and a scientist. My goal for scientists is to work together to invoke effective stewardship of our planet. Looking back at the many scientific conferences, speeches, and publications in which I have participated during my lifetime, I am puzzled why scientists have not made more positive changes in the state of our global environment as a result of our collective efforts. We ecologists feel disheartened that thousands of research projects in tropical rain forests have not reversed the decline of this precious habitat. We voice frustration that our multimillion-dollar pharmaceutical industry has not yet analyzed even 2 percent of the botanical species in tropical forests as potential medicines. We share disappointment that we do not even know the most common tree in South America, nor do we have any idea how many creatures live in our own backyards. Yet we know the chemicals that compose Mars, the structure of an electron, and the genetic makeup of a mosquito. Science has advanced in many arenas, but the ability to understand the machinery of our "home" is still lacking.

Perhaps my most valuable legacy will be a simple but effective suggestion, intended to impart a change in perspective to those who are parents or scientists (or both). Contemplate the current scenario: Scientists are busily cataloguing and observing the species in tropical rain forests, yet the habitat around them continues to shrink; parents are busy buying groceries for their children, but they have forgotten how to grow vegetables. Perhaps we need a different approach. Once again, I suggest borrowing the church's concept of tithing. What if all

scientists gave 10 percent of their research time directly to conservation and science education, in addition to their pure research? And what if parents pledged to spend 10 percent of their family time rediscovering nature?

In my corner of the scientific world, I interact with tropical biologists, ecologists, botanists, and canopy scientists. We are just beginning to use our collective voices to advocate for global change. If every research grant included a component of conservation, or education outreach to youth, and if tenure and promotion included a requirement for public science, then we might indeed achieve the underlying goal that inspired us to become scientists in the first place: a healthy planet. Both scientists and parents must take the initiative. As parents, we need to allow our children to get muddy, at least once in a while. The natural world exists everywhere: in sidewalk cracks, mold in refrigerators, ants at a picnic, spittlebugs on a goldenrod stalk, and in the pages of *National Geographic* read aloud. "Conservation over conversation" is perhaps the most meaningful take-home lesson for all of us.

SCIENCE AND SPIRIT

By Eddie, aged 17

(Adapted from Eddie's application to the Youth Theological Initiative at Emory University, which he attended during the summer of 2002)

Most of my classmates know me as a crazy-haired Australian chemistry whiz with a fondness for hacky-sack. Beside the long hours of crew practice and sporadic forays into the jungle, these classmates know nothing of my intense spiritual life. They do not know my long history of attending church, playing in the handbell choir, and contemplating my own faith through self-reflection,

prayer, and fellowship. Most of all, they do not understand how my faith has grown from my love for nature.

In years past, my faith grew most readily as I traveled with my mother to distant rain-forest ecosystems. The Peruvian Amazon in particular helped me to appreciate the true wonder of God's creation. Toucans, monkeys, butterflies, and vines filled the vast jungle cathedral towering overhead — individual parts of this masterful machine working in unison. What a treasure we have in this Earth, not only practically, scientifically, and aesthetically, but spiritually as well!

Upon returning from my journeys to Peru, I started thinking more about how my faith has been enriched by these intimate experiences with biodiversity. I came to realize also that science, rather than being an enemy to spirituality, can be a tool to interpret and glorify God's creation. My participation in the natural world has only served to strengthen my beliefs as a Christian. Furthermore, through my own thoughts I have helped others, including my mother, to integrate the concepts of science and religion without betraying either — something often rendered impossible by technical training in either discipline.

One of my strongest convictions regarding religion is the importance of knowledge. Knowledge can empower belief by providing a basis and a goal for further spiritual exploration. Thus, the more we understand through science about how our world functions, the better we can appreciate both science and spirit. In addition, it is our duty to spread our knowledge by teaching others to recognize the miracles of biodiversity on our planet.

After visiting the Peruvian Amazon, I feel an urge to teach others to respect and care for our natural world. Though humanity has faltered in its stewardship of the creation that sustains us, I think we can remedy this neglect through education and sharing of knowledge about the environment's beauty, economic and spiritual importance, and biological function. Our lives depend on it.

CICADAS: SEVENTEEN YEARS UNDERGROUND

By James and Eddie, aged 16 and 17

Recently, the seventeen-year cicadas hatched. This special type of insect burrows underground, where it remains until its biological clock tells it that seventeen years have passed. Thousands of these cicadas then emerge in a chaotic three-week stint of mating, buzzing, and crashing into windshields. Needless to say, this unique behavior draws a lot of attention from the public. Cicadas are hard to miss, with their constant drone in the background and their squished guts on sidewalks and windshields.

We have noticed two basic reactions to the cicada phenomenon. The first is revulsion. Most people we know are repulsed by the multitude of these creatures. The other sentiment toward the cicadas is one of excitement. This latter feeling is shared primarily by the other half of our acquaintances, who are eccentric scientists. They would rather collect these critters than exterminate them. They delight in the evolutionary genius of the cicadas, whereby they avoid predators through their seventeen-year cycle. We think the two perspectives on cicadas provide a lesson for any of life's problems: Attitude is everything. Even the smallest matters in life, such as tiny insects, will elicit a response that is either critical or enthusiastic. And as our mom once said, it is better to exclaim than to complain.

Appendix

Useful Equipment Handy for a Field Biologist in the Rain Forest

Comfortable shoes

Long pants and long-sleeved shirt (in Australia, I sewed my canvas boots to my pants, to minimize leech invasions)

Rain coat

Rain hat (a visor is useful for those who wear glasses)

Handkerchiefs (to wipe off perspiration)

Sunglasses

Water bottle

Small fold-up umbrella to hold over data sheets during rain

Hand lens

Swiss army knife

Daypack for supplies

Camera and film

Compass

Tape measure

Flashlight (for late returns)

Binoculars