

CES Monthly Musings

*Chronicling the Transition from Economic-Industrial
To Ecological-Cultural Societies*

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**CENTER FOR
ECOZOIC SOCIETIES**
Seeking Well-Being in All Life Communities

AT A GLANCE

- [A Walk in the Woods of Piedmont North Carolina, by David Otto](#)
- [Walking to New Hope Creek: Landscape History And Ecological Change, by Norman Christensen, Ph.D.](#)
- [Intuition, Logic, Ego, Sustainability, by Steven Lambeth](#)
- [Become a Member](#)

A WALK IN THE WOODS OF PIEDMONT NORTH CAROLINA

By David Otto



Dave Otto worked as a neurotoxicologist with the U.S. Environmental Protection Agency. He is now a historian, naturalist, photographer and activist living in Carrboro, North Carolina. He is on the events and publishing committees of CES.

Each of the events in the natural world is a poem, a painting, a drama, a celebration.

-Thomas Berry

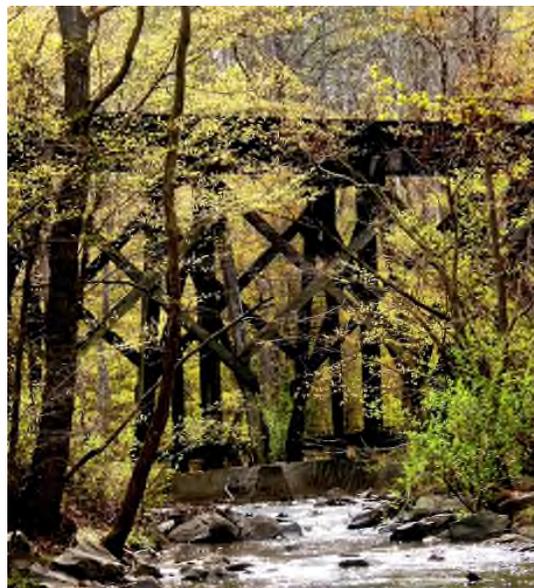
Thomas Berry warns that “We no longer hear the voice of the rivers, the mountains or the sea. The trees and meadows are no longer intimate modes of spirit presence. The world about us has become an ‘it’ rather than a ‘thou’” (Thomas Berry, The Great Work, 1999, 17). Too often we are caught up in the treacherous currents of today’s tragedy or scandal repeated monotonously on MSNBC or Fox News. However, this needn’t be the case. Regular walks in the woodlands offer a simple cure.

One of the joys of walking in the woods is the opportunity to escape from the stress, the hustle and bustle, the incessant barrage of information from the Internet and other electronic media which consume our waking hours. Instead, surrender to the slower rhythms of nature. Listen to the song of birds, wind rustling through the leaves, soothing music of water flowing over rocks. Look at the patterns created by wind rippling the surface of a pond or by the flow of a stream over rocks. Lie on the ground and discover the beauty of tiny wildflowers that carpet the woodlands in spring. Let your mind experience the effervescence of spring, the brilliant pageant of autumn and the magical transformation of woodlands after snow.

We are fortunate in the North Carolina Piedmont to have ready access to woodlands, streams and lakes where we can experience the beauty and serenity of nature. The marvelous patterns, rhythms, forms and colors which abound in nature are exciting to see and have kindled the imagination of artists since the dawn of time. Poets express these patterns and rhythms in written and oral form, while painters and photographers portray them in visual form. I would like to share some of the joy I have found wandering along the streams and through the woodlands of this region.

Bolin Creek is a small, but lovely stream that flows through Carrboro and Chapel Hill, North Carolina. Much of the stream corridor has been preserved by the town of Chapel Hill and the University of North Carolina for future generations to enjoy. Join me on a walk through the woodlands, peering into ponds and creeks at continuously changing reflections and rejoicing in the amazing grace of wildflowers.

We will start our walk in spring, a magical season. Deciduous trees suddenly burst out in brilliant, iridescent yellow-greens. Catkins adorn the branches of many, joined soon by miniature leaves in the joyous celebration of renewal. Bolin Creek flows under a railroad trestle just upstream of Estes Drive, a wonderful place to begin our walk.



I will describe some of the trees and flowers that we will see on this walk. Many of these plants have important medicinal qualities known to Native Americans and early settlers, but forgotten or resigned to folklore with the ascendancy of the pharmaceutical industry in the 19th and 20th centuries. The growing popularity of alternative forms of medicine has renewed interest in the medicinal value of native plants, which we will consider in our walk today.

Rue anemone or windflower is one of the first ephemerals that erupt in the woodlands and along streams after winter. The diminutive white flowers carpet the forest floor before the canopy of deciduous leaves covers the woodlands in shadows. Other members of the initial quartet of ephemerals are the jaunty yellow and brown trout lily, the lovely pale blue hepatica and spring beauty, which sometimes delights the eye with beautiful pink striations.



The perfoliate bellwort is one of the most graceful, unassuming and unusual of the spring ephemerals. The pale yellow flower nods shyly along the margins of the forest, blooms briefly and then is gone. The perfoliate nature of the flower, wherein the stem seems to pierce the leaf, and small glands, which form bumps on the inner surface of the sepals, are distinctive features.

Another spring flower that we are apt to see is the crested dwarf iris, found throughout the Southeast. The lovely violet to light blue flower grows on rich wooded slopes and floodplains in partial shade. The name comes from the golden crest on each sepal. The yellow crest guides pollinating insects to the nectar deep within the flower.





The most common trees growing along Bolin Creek are beech, ironwood, sycamore, oak and maple. In April the creek corridor explodes in subtle yellow-green pastels as the leaves emerge. The male flowers of the oak and ironwood form long catkins which hang down from the limbs and produce pollen. The catkins flutter in the breeze, pollinating female flowers, and then drop to the ground. Catkins and pollen floating on the creek produce marvelous abstract patterns.

One of the most colorful trees in the Piedmont woodlands in spring is the red maple. Clusters of tiny quarter-inch flowers bloom and then become pairs of bright red-winged seeds, called samara. Many of us were fascinated with samara as children, delighting in tossing them in the air and watching them spin to the ground. The leaf stems are also red. However, the most spectacular display occurs in autumn when the leaves turn brilliant crimson.



George Humphries, one of the finest nature photographers in North Carolina, published a small book in 1998 entitled *Reflections*. In the preface he wrote: “As (all the great sages) came to know, there is morality in the dawn, integrity in the forests, righteousness in the hum of creeks, and glimpses of heaven in reflections.” Bolin Creek flows over a rock shelf a few hundred yards upstream of the railroad trestle. A wooden pedestrian bridge spans the creek here and is a popular crossing point, as well as an excellent location to view reflections. The jagged edges of the rock ledge distort reflections of tree trunks and foliage in marvelous patterns which vary with water level in the creek, time of day, weather and season. The wooden bridge allows you to shift position over the water to capture the most interesting patterns.

Wild comfrey is a perennial herb, sometimes called Blue Hound’s tongue, which is uncommon in the Piedmont. Clusters of small pale blue flowers bloom atop tall (3-8dm) stalks, with basal clumps of large (1-2dm) fleshy leaves. The herb is valued for its medicinal qualities. Leaves were used by the Cherokee for tobacco and roots for the treatment of cancer.



Coral honeysuckle is the only honeysuckle species native to the Piedmont. The bright red trumpet-shaped flowers attract hummingbird pollinators and are among the most colorful spring flora. Like the bellwort, Coral Honeysuckle is perfoliate.

Black cohosh is an impressive plant, often more than six feet tall. Black cohosh is widely used in folk medicine for its estrogenic and anti-inflammatory qualities. Native Americans and early settlers used the herb to treat a variety of ills including pulmonary problems, snakebite and pain control during childbirth. *Katydids are nocturnal herbivores, but also eat other slow-moving insects such as caterpillars. This katydid sat patiently on a raceme of the stately black cohosh, posing for a portrait.*





The brilliant orange color of butterfly weed attracts butterflies, the reason for one of its common names. Few wildflowers can match the visual impact of orange milkweed, another common name, as you wander the woodlands in summer. This “weed” is like a mischievous child, having alternate leaves and lacking the milky sap found in other members of the milkweed family. Native Americans chewed the roots to treat pleurisy and other lung-related problems, yielding a third common name, pleurisy root.

Asters are among the last wildflowers that bloom along the margins of Piedmont woodlands in autumn. Different species come in white, pink, lavender and purple, contributing a subtle baseline to the brilliant display of trees. Paul Green observed that “For all its beauty [the aster] still awaits the praise of a single Valley poet” (*Paul Green’s Plant Book*, 2005, 4). *A variegated fritillary butterfly is feeding on the aster.*



One day I found a splendid fern (ebony spleenwort), shaped liked a dove of peace, growing in the crotch of a large oak tree. This spleenwort closely resembles the Christmas fern, common in local woodlands. The name “ebony” refers to the distinctive dark brown stem. The fern is hardy, drought-tolerant and grows in soil and on rocks and masonry. Ebony Spleenwort is the only North American fern which also grows in South Africa.



The intense yellow, orange and red colors of the sugar maple in October are spectacular. Sap from the tree is refined to make maple syrup (approx. 40 gals. of sap are needed to produce one gal. of syrup) and maple sugar. Timber from the sugar maple is very hard and valued in the manufacture of furniture, flooring and cabinets.

Beech leaves, unlike leaves of other deciduous trees, remain on the tree throughout winter. The light brown beech leaves provide welcome color and contrast in the woodlands during the cold months, while maples, ironwood, hickories and oaks stand naked. When snow cloaks the forest in white, beech leaves stand out like golden jewels.



We have completed our walk along Bolin Creek, enjoying the beauty and wonder of the trees and wildflowers. It is time now to leave the woodlands and return to the more harried pace that characterizes most of our lives. In his essay about "The Meadow across the Creek," in the Great Work, Thomas Berry describes the formative experience of seeing the lilies in the meadow and how that event shaped his thinking throughout life. We too can experience the same epiphany and communion with nature by making a walk through the woods a regular part of our lives.

WALKING TO NEW HOPE CREEK: LANDSCAPE HISTORY AND ECOLOGICAL CHANGE

By Norman Christensen, Ph.D.



Norman Christensen was the Founding Dean of the Nicholas School of the Environment at Duke University where he continues to work as a research professor. He is also past President of the Ecological Society of America. The text below was given as a speech at United Church of Chapel Hill in January 2013.

I was attracted to Duke University nearly 40 years ago, and chief among the attractions was the opportunity to focus my research in the university's 8,000 acre research forest. As a doctoral student, I had been admonished often by my major professor to study nature and nature only; meaning, avoid places influenced by the activities of humans, in part because they inevitably confounded ecological patterns, and in part because human activities were considered irrelevant to the construction of proper ecological theory. I imagined that the Duke Forest would provide ample opportunity to follow my professors' admonitions. Soon after my arrival, I was mightily disappointed to learn that nature absent of human influence was not to be found anywhere on this landscape.

But, it was worse than that; nothing in the character and distribution of these forests made an ounce of sense without first understanding the impacts of people over time scales of decades, centuries and millennia. With time, however, my disappointment gave way to a fascination with the factors shaping the interactions between people and the land, and that fascination has motivated and informed much of my research since.

I was blessed with wonderful graduate advisors, but I now know that on this matter, they had it wrong. In a world of seven billion human souls, there is no such thing as nature untrammelled by humans, and ecological theory that does not embrace this truth is of little use.

I would like to share with you now the major lessons of this 40-year journey.

I'm rather certain that great many of you have walked through the woods in places like Duke Forest, the North Carolina Botanical Garden or Umstead State Park. One such walk in Duke Forest is a favorite of mine. It begins in uplands along Mt Sinai Road and descends to a wooden bridge crossing New Hope Creek. Most who use this heavily traveled trail give little thought to the origin of the woods that surround them; most of those who do, assume from the large size of the pines and various hardwoods that these are ancient woods, primeval perhaps.

But, 140 years ago, standing on a hilltop at the midpoint of this trail, you would have been surrounded by abandoned, and badly eroded cotton and corn fields reminiscent of some of the sorriest deforested landscapes on our planet; like places you might see today in Haiti and Madagascar.

The history of this hilltop and the lands that surround it is representative of the history for lands across this region, and many other regions. It has much to teach us about the ethics of sustainable land use.

This land was first settled and farmed by Europeans in the middle of the 18th century, and this particular property was first privately owned in about 1750 by a gentleman named John Patterson. It came to him a rather generous grant of several thousand acres from Lord Granville, the colonial governor. Looking from the top of this hill, it was Patterson land almost as far as the eye could see.

But, the Pattersons were by no means the first people to make a living off this land; over 10,000 years of human activity preceded them. The first humans arrived here sometime between ten and twelve thousand years ago. The impacts of these hunter-gatherers on the land were disproportionate to their relatively small numbers.

They hunted with great efficiency, and they were the primary cause for the extinction of much of the once abundant megafauna mammoths, giant sloths, camel-like ungulates and saber-tooth cats. At least as important, these people brought fire to this landscape and used it with great purpose to create and maintain open forest conditions that supported the plants and animals that sustained them.

Even more people populated this landscape 4,000 years ago. The so-called Woodland people of this time were semi-nomadic, cultivating crops such as squash and tomatoes in floodplains (such as along nearby creeks and rivers) and hunting white-tailed deer, elk and woodland bison. They, too, managed their landscape with fire.

Mississippian people, the first fully sedentary and agricultural Native Americans, appeared here about 1,500 years ago. These were the mound building people who established towns and cultivated crops in low lying areas such as along New Hope Creek and the Eno River. They coexisted and likely traded goods with Woodland people up to the time of the first European contact.

These were not scattered bands of people on a wilderness landscape. What we today call North Carolina was, in 1491, home to as many as a million people.

So, John Patterson may have been the first human to have formal title to this land, but he was by no means the first to manage it and depend on it.

By the mid-18th century, disease had reduced the numbers of indigenous people ten-fold, but their historic impacts still echoed across the landscape. For sure, what the Pattersons saw as they traversed their estate for the first time were forests and bottomlands shaped by the actions of hundreds of human generations.

That the Industrial Revolution was just beginning was of little consequence to the Patterson family in 1750. They cleared and prepared land for cultivation with little more than

axes, plows, oxen and their own hard work. We don't know the details of their particular practices, but we do understand most land in this region was being farmed in the context of a subsistence economy. People farmed only small portions of their large ownerships, growing to meet their needs, with surplus enough to trade in nearby towns, such as Hillsborough, for things they couldn't grow themselves.

This is a good moment to call attention to the fact that agriculture is inherently not a sustainable enterprise. When land is cleared, erosion rates increase ten to one hundred fold. Furthermore, the supply of essential soil nutrients, such as nitrogen and phosphorus, is rapidly depleted as these elements are incorporated into plant and animal tissues and then harvested and exported from the land. No surprise that, after land clearing, agricultural productivity declines by more than half within only a few growing seasons. This, by the way, is why nearly all Native American farming was confined to floodplain areas where seasonal flooding and siltation continually restored fertility.

In those early decades, the Pattersons and most of their neighbors practiced a form of shifting agriculture — a farming system that has at least the potential to be sustainable. The process was begun by clearing a 3-5 acre tract of land—an arduous process given limited human and technological resources. As productivity declined after a few years, they would let that tract go fallow (i.e., they would abandon it), and begin farming another. In our region, fallow land is very quickly re-vegetated by a succession of plant species. In the first year, annual weeds prevail. In the second and third years perennial grasses and herbs—broomsedge, asters, goldenrod and the like—take over along with the seedlings and samplings of young vines, shrubs and trees. After 4-5 years, those species and associated herbs form a diverse and impenetrable thicket. Importantly, over these 4-5 years, this succession of plants has the effect of restoring soil organic matter and stores of those nutrients essential to plant growth. Left to its own devices, this thicket would soon develop into a young forest. But here, the farmer intervenes, re-plows the land and begins another cycle of growth.

I say this farming system was potentially sustainable. Whether that potential was realized depended on the amount of land in production and whether fallow cycles were sufficiently long to ensure restoration.

John Patterson sold his property to William Robson in about 1790. Within a decade, the fallow system of agriculture was all but abandoned for several reasons. Populations and urban centers were growing, and rural barter markets were rapidly giving way to fully monetized economies. Worldwide demand for agricultural products—most particularly cotton, tobacco and dye stuffs like indigo—was growing exponentially. These crops grow especially well in this region. Furthermore, technologies such as the cotton gin and mechanized looms allowed the processing of these crops on very large scales.

Farm families like the Robsons were no longer growing things they themselves needed (you can't eat cotton and you can only smoke so much tobacco). Rather, they were earning money and buying their needs at market.

This change from subsistence to market economy has, itself, important impacts on human behavior. Economists assure us that our utility or desire for things diminish as we acquire more and more of those things. After all, you can only use so much of any foodstuff, so many tools and so much clothing. But money is not a thing, it is an abstraction for things . . . and it seems the more we have, the more we desire. . . . You just can't have enough.

Taken together, these developments vastly altered incentives for land use and stewardship, and they set in motion economic, social and ecological change that would prove to be truly unsustainable. Rather than allow land to lie fallow, Robson and his neighbors countered declining productivity by putting more and more land into production. The uncertainties associated with regional and global markets reinforced this behavior.

By 1820-1830, well over half, perhaps a 1,000 acres, of the Robson property was in cultivation. In 1750, this region was probably 90% forest; by 1830 it was less than 50% forest. By 1860, only 30% of the region's forests remained, and these forest fragments had been severely degraded by livestock grazing and high-graded for fuel wood.

In 1830, the tractor was still nearly a century in the future. Then, a single family, no matter how large, could not by itself farm 1,000 acre. As we all know too well, they accomplished this with human chattel—slaves. Although it had been on the decline in the late 17th century, this transition to market agriculture greatly increased the demand for and dependence on slavery. We don't know the specifics of the Robson's holdings, but nearby ownerships of this size often depended on the labor of 100-200 slaves.

The impacts of continuous farming had devastating effects on this landscape. Studies indicate that between 1800 and 1860 erosion removed an average of 1-2 feet of soil from exposed cropland across this region. In the woods along the path to the Wooden Bridge you will see that deep erosion gullies still scar the hillside. By 1860, per acre productivity had been reduced many fold.

The impacts of this erosion extended well beyond individual farm fields as sediment polluted creeks and rivers, filled in mill ponds and caused the closure of water-driven mills on all but the largest streams.

The regional economy went through ups and downs, but mostly ratcheted down. The pattern of change has something of a modern ring to it. Variations in the markets encouraged widespread debt financing. By the mid-19th century, most ownerships, including the Robson's, were heavily mortgaged. Produce buyers such as the large textile mills typically held the mortgages. In the case of Robson's lands, that was Erwin Cotton Mill, honored today by naming the public road connecting Duke Forest to Chapel Hill "Erwin Road."

Sustainability is often likened to a three-legged stool, with the legs representing social, economic and environmental systems and the seat representing the inescapable linkages

among these systems. Surely, the changes for Robson and his associates during this period—the inexorable downward spiral of increasing dependency on a despicable institution of slavery, the loss of essential ecosystem functions and services, and ever increasing fragility of the economic system—validate this metaphor.

The Civil War was a watershed moment. Slavery was abolished, although many the social injustices associated with it persist to this day. It inaugurated a period of regional economic depression that would extend up to World War II. The Robson estate, like those of the majority of his neighbors, was put into foreclosure and ownership passed to the mortgage holder, Erwin Cotton Mills. Indeed, it was from Erwin Cotton Mills that James B. Duke bought much of the land that he chose as the site for his eponymous university and forest.

And what about the land itself? Although tenant farming and share cropping continued in some places, much of the land was simply abandoned . . . at long last. Much of the land along the Wooden Bridge trail was abandoned in about 1870 and that fallow succession was repeated once again. Old field weeds were soon replaced with a dog-hair thicket of pines. Through time, that thicket thinned to a respectable forest as faster growing trees overtopped smaller competitors. When Duke Forest was formally established in 1931, those pines were about 60 years old and broadleaved trees—oaks, sweetgums, maples and hickories—were prominent beneath them. But, the very features that make pines such successful pioneers in open fields, limit their ability to persist beyond a single generation. Unable to grow in their own shade, the pines are today gradually being replaced by the hardwoods. Walk to the Wooden Bridge in 30 years, and the pines along that path will likely be gone altogether.

What happened on this hillside, was repeated on millions of acres of abandoned land across this region. Between 1870 and 1940, forest cover increased from 30 to over 70% of the landscape. Shortleaf and loblolly pine regenerating on this abandoned land now provide the raw resource—lumber and pulp—for one of the world's most important timber economies. Much former crop land in this region is now central to that economy.

Whether managed for timber or not, rapid change continues on this landscape. Once rural land is rapidly becoming urban. Forest is being replaced by complex, impervious surfaces like roof tops and roads that greatly alter local climate, not to mention the quality, quantity and timing of water flows.

When Duke Forest was dedicated in 1931, its woods were part of a contiguous landscape of forest and open fields. Today, the Forest resembles something closer to New York's Central Park. Individual forest tracts are losing their unique character as they are invaded by a welter of plants introduced from virtually every continent. As a consequence, the overall biological diversity of this landscape has diminished considerably since that dedication.

Exactly 30 years ago, I was invited to address a convocation of entering freshmen in the Duke Chapel. I chose to talk about the change that had occurred in the Duke area. But I was then far less certain about the lessons to be derived from that change.

I recall finishing the talk with a simple observation that folks like William Robson came, went and left their mark and I allowed as how all those freshmen would probably do the same. Today is my chance to provide a much more specific and meaningful interpretation of that history.

Several times in this talk, I have used the word sustainability. This is a term with its own long and somewhat confused history. In the late 19th century, people spoke of sustainability in terms of the ability to move and process natural resources to growing markets. The concept of sustainable yield management of croplands, forests and fisheries was focused on how best to extract, transport and process resources. It was all about meeting demand. And, why not? There was still prairie sod to be broken, wild forest to be harvested, and abundant un-fished waters.

By the time of the Great Depression, untapped virgin resources were becoming rare, and many scientists and resource managers seriously wondered whether croplands, forests and fisheries could be relied on to provide resources after repeated harvest. The concept of sustainable resource management—focusing on the capacity of ecosystems to supply resources through time—grew out of that concern.

With the subsequent explosive growth of our population, the concept of sustainable management was further enlarged to include the need to manage for multiple resources and competing interests in particular places. How do we grow crops and harvest wood fiber and still maintain abundant wildlife and biological diversity, clean water and aesthetic beauty? Sustainability in many places became synonymous with the concept of multiple use management.

The word "sustainability" is misleading. "To sustain" is defined in many dictionaries as "to keep in existence, to maintain." This implies to some an idealistic endpoint, a destination. If we do X, Y and Z, we will achieve a sustainable future. But if history tells us anything, it is that sustainability cannot be static. It must be seen as a journey, not a destination. That journey always occurs in the context of change.

Any notion of sustainability must accommodate the inevitability of three kinds of change!

The world is changing. It always has and always will. The capacity for ecosystems to change is essential to their persistence. Forests are constantly being disturbed and constantly undergoing change. Over the long term, change is essential to adaptation and survival.

We are changing. We always have and always will. Each generation of human beings brings new technologies and values to the land. My interests and values are very different from my parents and grandparents, and the interests and values of my children and grandchildren are no less different from mine.

We are changing the world. This, too, we always have done. But today there are seven billion of us and our individual impacts are disproportionately magnified by the power of the technologies we employ to garner the things we need or think we need.

Ecological change shaped the landscape that greeted the first human occupants of this landscape. For better or worse, their activities altered the process of change in ways that influenced resource options for successive generations.

The land granted to the Patterson family in 1750 was the product of millennia of interactions between ecological and human change.

Over several generations, the Pattersons, Robsons and others inflicted unprecedented change on the land; change that, at least in the short term was clearly unsustainable. Yet, we can take heart in the amazing restorative capacity of ecosystems. Ecosystem change has repaired some of the impacts of those many years of unsustainable land use. But they are far from erased. No vestige of old-growth forest remains, and it will take many more decades, even centuries, to restore soils to their pre-agricultural productivity.

Today, we, too, are mighty agents of change. And surely we would like to believe that nature's change processes will mitigate our impacts, too. But history provides no guarantee of this. Too often, we fail to recognize the unprecedented magnitude and character of our impacts. Our planet's human population has increased 10-fold since the Robsons abandoned their land, and each of us individually consumes 5-10 times more energy and resources than did the Robsons and their peers. Furthermore, many of our impacts have no precedent in either historic or prehistoric times.

Environmental ethics aims to provide a framework or frameworks for making appropriate choices — for discerning right from wrong actions — on this sustainability journey. A review of the literature in this discipline, however, can be daunting and confusing.

Those of a utilitarian bent argue that an action is right if it provides the greatest benefit or utility to the greatest number. This majority rules ethic, however, has proven over and over to be myopic.

Those who focus on the importance of the functions and services provided by nature's ecosystems repeat Aldo Leopold's admonition that "a thing is right when it tends to preserve the integrity, stability and beauty of the biotic community. It is wrong when it tends otherwise."

Those who are concerned with the well-being of human communities are apt to see strong connections between sustainability, equity and justice as suggested by the United Nations Commission on Sustainable Development. An action is right if it meets the needs of the present without compromising the ability of future generations to meet their own needs.

Many would expand this notion of intergenerational responsibility to include responsibility to all communities today and in the future.

What the history of this land tells us is that these visions of environmental right and wrong are intimately intertwined. Land management decisions ultimately provided benefit or not depending whether the ecosystems they impacted could continue to deliver essential resources and services over long periods of time—multiple generations. Historical actions that diminished the dignity and well-being of other people were not sustainable in either economic or environmental terms.

My students sometimes find it disconcerting when I assert that sustainability is an inherently human concept—one that is necessarily anthropocentric. My point is simply this: For countless eons, Earth's myriad ecosystems functioned wonderfully in our absence. No other single organism during those eons impacted our planet to the extent that we have.

Study nature and you will understand that, were we to disappear tomorrow, ecosystems would continue to change and life would continue to evolve. In a few millennia, the scars of our actions would be reduced to a thin, albeit messy, layer in Earth's geologic strata. We are not an essential element to any of Earth's ecosystems save for those we have created such as cities and farm fields.

I like to close out my undergraduate environmental science and policy course by sharing my favorite Gary Larson cartoon. A dinosaur stands at a lectern before an audience of other dinosaurs and says, "Friends the picture is bleak. Climates are changing, mammals are on the rise, and here we sit with brains the size of a walnut."

Dinosaurs are, unfairly I think, often depicted as the metaphor for unsustainability — unable to adapt, they were merely a cul-de-sac in the history of life. But, consider that these remarkable beasts dominated Earth's ecosystems for a couple hundred million years.

We humans measure our tenure on Earth only in the tens or hundreds of thousands of years. We are prone to believe that the history of life that preceded us occurred solely for our benefit. That belief supports denial among some that we actually have the capacity to alter our world in ways that might irreparably diminish its capacity to sustain us. There is nothing in our history of interaction with the land to support that sort of denial.

We are fond of calling attention to features—intelligence, self-awareness, empathy—that we believe set us apart from all the rest of creation; we have brains the size of a grapefruit. Sustainability is all about demonstrating that these features will truly ensure our tenure and the quality of our lives in the long term.

INTUITION, LOGIC, EGO, SUSTAINABILITY

By Steven Lambeth

Steven Lambeth graduated from the University of North Carolina at Chapel Hill in May 2013. He is beginning an internship at Pickards Mountain Eco-Institute near Carrboro, NC. This is an abridged edition of a paper he wrote in his final semester for an anthropology course.

All living beings, including humans, are necessarily embedded in physical environments, or ecosystems, which both enable and limit population growth. This is the basic concept in the study of ecology, which has shown that every ecosystem has a carrying capacity expressed as the “number of [individuals], living in a given manner that an environment can support indefinitely.” (William Robert Catton, *Overshoot*, 1980, 4)

The State of Our World as It Pertains to Industrialized Consumption

Humans have a long history of working to increase the carrying capacity of their environments. The advent of agriculture allowed us to greatly increase the population levels our ecosystems could sustain and technological advances have led to further increases in the carrying capacity of our environments throughout the subsequent years. To use Catton’s language, however, since the mid-nineteenth century, industrialized societies such as the United States have switched their approach from using “methods that permanently enlarged human carrying capacity” such as the western expansion in the United States that gave more territory and resources to exploit, to “methods that have only enabled us temporarily to evade the world’s limits.” (Catton, 4) Indeed the populations of industrialized societies have surpassed the carrying capacities of their ecosystems at the expense of the environmental resources that are ultimately necessary for sustaining those populations. The great loss of biodiversity we have seen in recent years is perhaps the most prominent, currently observable consequence of this excessive ecological footprint.

When a population surpasses the carrying capacity of its environment, it goes into a state of “overshoot,” from which the only way out is a decline back to a sustainable level. (Jorgen Randers, *2052: A Global Forecast for the Next Forty Years*, 2010, 307). Further, it only takes the depletion of one vital resource to cause population growth to give way to population decline. (John Michael Greer, *The Ecotechnic Future: Envisioning a Post-Peak World*, 2009, 5)

While one of the many resources upon which human life is dependent is the biodiversity that allows for productive ecosystems, the Western way of life is far more likely to be put into decline by the depletion of cheap energy that we harness from the burning of fossil fuels. The world production of conventional petroleum has been declining since 2005, a decline that has been masked by an increase in the production of natural gas, tar sand extractives and biofuels. (Greer, 9) These alternatives, however, are not a viable replacement for petroleum as our natural gas reserves are subject to rapid depletion and liquid fuels from tar sands and biofuels require large energy inputs, primarily from petroleum, to yield usable energy.

Developments on the level that would allow renewable energy sources to replace our dependence on fossil fuels are unlikely to occur as their research requires significant energy inputs and all of our current “energy sources are fully committed to existing needs[;] any attempt to free up resources for some new project will conflict with the demands of existing economic sectors.” (Greer, 9-10) It seems, therefore, that industrialized societies are on a crash-course as they are depleting the resources on which they depend. Furthermore, “Even the less industrialized societies have become so dependent on the industrial system that their survival too is in doubt as fossil fuels run short.” (Greer, 9) For the first time ever, humanity as a whole is confronted with a predicament from which there is no escape and there are no winners.

We have the choice to willingly scale down our energy consumption and greenhouse gas emissions so that this decline is more easily manageable or to continue with “business as usual” and experience a greater amount of loss in a manner that will be far more jarring to our everyday lives. The former option offers humans the opportunity to make meaningful connections with their fellow humans in the experience of community and with their environment through practices such as gardening, while experiencing population decline gradually.

The latter option, while permitting a more luxurious life in the immediate future, will likely find humanity experiencing this decline in a series of sudden, acute instances of great suffering and loss that will leave parts of the human population helpless and hopeless as they attempt to persist under conditions that are drastically different from the ones they have learned to cope with throughout their lives. Having experienced the loss of my Mother in a gradual process I could prepare for, and two grandparents rather suddenly, I can say from experience that it is much easier to find meaning in loss when you can do so through a grieving process rather than in the midst of a sudden shock, and it is precisely the meaning we find in life that makes one’s subjective experience worthwhile.

In order to take the prudent route of willingly reducing our consumption, we must relocalize by grounding the economy in resilient communities. When we become more able to provide for our needs from sources closer to home and begin to identify with a shared experience of life, our communities will be much more able to adapt to the problems they will face. It is my sincere intention to help, to the best of my ability, in the building of community-centric nets that will catch us as we pass over the edge of this cliff.

A Critique of Our Institutionalized Education System

While studying planetary crises and transition movements as a part of my university education, I have been introduced to a vast amount of information that has led me to form the perspective I have just laid out. Perhaps the most influential class I have taken in my college studies was on the concept and application of systems theory. From the very beginning of my formalized education, I have been taught to consider the world through the lens of cause and effect. Indeed, the principle of cause and effect lies at the very heart of science, which is a cornerstone of Western society. Scientific understanding is advanced through experiments in

which the effects of a particular action on a particular variable are observed and measured so as to support or refute a hypothesis about the cause of a certain phenomenon. Central to these experiments is the ability of the experimenters to control for outside variables. Trials are repeated numerous times and in different ways so as to isolate the variable of interest by showing that the experimenters' action is the cause of the phenomenon rather than another, uncontrolled variable. For instance, when studying the effects of different types of music on the growth of plants, an experimenter would have to show that each plant tested was planted in the same soil and received the same amount of light and water each day as the other plants, so that the only difference in the growing conditions of each plant was the music that was played. By isolating the variable of music, the experimenters would show that playing different types of music causes variations in the growth levels of plants.

While this cause-and-effect approach to understanding our physical existence is functional for describing more rudimentary and even some very complex phenomena, it imprudently suggests that humans have the intelligence to fully understand the effects of various phenomena including our own actions. The fact that we cannot possibly conceive of all of the causes and effects of any action was made painfully clear to me during the class I took on systems theory. The essential tenet of systems theory is that every phenomenon is embedded in a system of innumerable interrelated elements and that a change in any single variable within that system will ripple throughout by way of the interconnections between variables, thereby changing the system as a whole. Studying the systems theory approach made evident to me that humans are incapable of conceptualizing living systems in their totality.

Furthermore, classroom education tends to be limited to introducing students to abstract concepts. Lecturers can relate ideas but cannot transmit understanding to students. Indeed, evidence of this truth can be seen in the fact that our universities require students to supplement lectures in the hard sciences with concurrent laboratory studies. A student can memorize science's conception of how a cell functions in the abstract realm of the classroom, but it is not until they observe real cells in motion that they begin to see, much less understand, the complexity inherent within that system (which is undoubtedly far greater than is expressed in that student's concept of how cells work). This disconnect between classroom lectures and experience is no shortcoming of our professors, but rather is due to the inherent limits of language on which we all rely for communication. For instance, an individual can be introduced to a concept by reading a book, listening to a lecture or engaging in conversation, but it is not until he is able to reinforce that concept with examples from his or her own experiences that he or she may begin to understand how that concept is embedded in reality. Because understanding is necessarily grounded in experience and every individual's life experience is different, we cannot directly transmit meaning and understanding to each other. Rather, we are limited to dancing around meaning and understanding through the use of language, thus transmitting abstracted concepts which an individual can then begin to ground in his or her own experiences.

Herein lies a fundamental flaw of our institutionalized education systems: In the classroom students are taught concepts that are abstracted from the reality in which they are

grounded and, because humans do not have the intelligence or knowledge to conceptualize the innumerable interrelated variables that comprise the systems of that reality, we repeatedly fail when imposing changes that we conceptualize from those abstractions onto our experienced realities.

Cells do not operate as they do because they follow the patterns we have been taught in school, but rather the only reason we have knowledge of those patterns is because we have observed their behavior, which occurs regardless of human awareness. Indeed, many philosophers such as Marcel Mauss, have warned that “it is essential to move from the concrete to the abstract, and not the other way around.”

There are, however, many instances of humans imprudently disregarding this advice, imposing ‘solutions’ that were dreamt up in the abstract realm onto real, material living systems, and failing miserably. For instance, cattle were imported in mid-20th century Australia as a desired agricultural commodity, but it was not anticipated that the cattle defecation would not deteriorate on account of the native dung beetle preferring smaller, kangaroo dung. To remedy this problem, it was decided to import African dung beetles, which are accustomed to cattle dung. While this led to the deterioration of the now rampant cattle dung, the African dung beetles, who had no natural predators in Australia, proliferated and caused a further imbalance within this ecosystem. To remedy this, the Australians brought in cane toads, which are natural predators of the African dung beetle. As the beetles, however, tended to live at the roots of sugar cane and the cane toads at the top, the cane toads did not serve to contain the beetle population but instead, as they also had no natural predators, proliferated and still are seen as a problem in Australia today. It is easy to see how humans, particularly those who have excelled in the abstract realm of their formalized education, might egotistically think they can impose ‘solutions’ conceived within their abstract conception of a living system onto the physical reality of that system. Time and time again, however, we have seen how limited our intelligence is when these solutions failed and led to greater problems.

The planetary crises we currently face are of historically unprecedented magnitude and are embedded in systems comprised of an inconceivable number of variables and connections between those variables. I know that I am not alone in having experienced frustration, despair, headaches and the loss of my sense of grounded identity many times when trying to conceive of the state of the world, much less trying to come up with any sort of solution to these crises.

Yet, as I sit in classes that address planetary crises, I cannot shake the feeling that my generation is expected to solve the problems created by those that preceded us.

From Logic to Intuition

By relying on education in the abstract, this country is raising a generation of individuals who might conceptualize the state of the world, but will not genuinely understand the problems that we face. I for one do not trust that a generation armed only with abstract concepts will be able to improve the resilience of our nation so as to minimize our own suffering and that of future generations. Furthermore, our political system, which is the most

prominent outlet for changing the American way of life, is comprised of individuals who are a product of our education system, a system which tends to instill in students an egotistic idea that we can successfully impose abstracted ‘solutions’ onto physical systems.

I understand that there is little value in pointing out a problem without proposing a solution, and I do not have any feasible suggestion for changing our educational and political system from the top-down. I do, however, see a legitimate opportunity to change the minds and behaviors of American citizens which could, in turn, affect larger changes by moving from the bottom up. As I am myself an American citizen, I have come to realize that the best starting place on this journey is to change my own approach to understanding. After graduation, I will be accepting a much less luxurious way of life and will begin learning organic farming practices.

I am driven to know what it feels like to work directly with the land for sustenance. Furthermore, the strongest communities in this nation seem to be centered on the localized food movement and I yearn to know what community actually feels like. I want to know what it means to depend on my neighbor and the solidarity that comes through that experience. For I know that it is only after experiencing this way of life that I will be able to understand how to go about manifesting the changes I want to see in the world.

As the logic-centered approach to problem-solving embodied by our institutionalized educational system falls short of giving individuals the tools to successfully create resilient, sustainable communities that live harmoniously as a part of their environment, we must shift to a more experience-based approach that will instill a deeper understanding and appreciation of life in coming generations.

Rather than relying on a logical system which teaches in the abstract realm and assumes that humans have the intelligence to comprehend living systems on the level that would allow us to successfully impose abstracted ideas onto those physical systems, I propose we begin to approach education in a way that focuses primarily on providing individuals with real life experiences which will allow them to feel rather than to conceive that their actions are aligned with the work we must do. In short, I am proposing that we emphasize experience and intuition rather than logic.

On account of the capacity to singularly master it, an identification with logic very frequently leads individuals to understand themselves as self-contained, separate individuals. This identification feeds the ego, which is an attachment to a concept of self that revolves around the idea of “look at what I can do.” The ego thrives off of individualism and does not ask for help. In a capitalistic society in which short term gain is valued highly and one can frequently gain the most at the expense of the common good, a mastery of logic and a strong ego can be a perfect combination for individual monetary success. Individual success is, however, not enough. We got into this predicament together and we must work collectively if we are to have any hope of improving our future trajectory. We must look out for our neighbors and likewise be comfortable asking our neighbors for help if we are to build resilient communities that work for the betterment of all.

Whereas logic is an abstract invention that can be mastered, intuition is intrinsic to human nature and is necessarily grounded in our physical experience of life. It is felt rather than conceived. Furthermore, intuition is a guiding force that acts on us as pieces of a larger, universal process rather than as egotistic, individualized selves. Throughout the history of the universe, as far as we can tell, there has been one overarching theme: a “tendency toward complexity. “ Immediately following the Big Bang, there were only tiny bits of matter, which then came together to make particles, and then atoms from which molecules were formed, which came together to make stars. As the first stars lived out their life cycles and exploded, new atoms came together to make more stars and planets. Indeed, everything on this planet, including ourselves, is made of stardust and this same tendency toward complexity has been the pattern of life on Earth. The first life forms were single-celled organisms, which gave way to multi-celled organisms and then to worms, which led to fish and then plants on land, eventually ending up with mammals and then humans.

A similar progression has dictated human history, which has seen our species move from hunter-gatherers, through the agricultural and industrial revolutions, all the way to the complex civilizations of today. However what separates humans from other beings, consciousness, is essentially the ability to choose how we act, and furthermore to choose to work in harmony with or against this universal tendency toward complexity. (Gregory David Roberts, *Shantaram*, 2004, 479) There is a universal intelligence far greater than human intelligence that guides all processes of the universe toward this greater complexity.

Do you think that you have such a high level of intelligence that you could guide the growth of a tree’s limbs so as to maximize the solar radiation that tree receives, or, to bring it closer to home, dictate the functions within and between the trillions of cells in your body? The expression of this universal intelligence within us is what we call intuition. Despite the frequency with which we have historically chosen to function outside of this universal intelligence through acts of warfare and exploitation, the time has come where working only out of narrow self-interest is in direct competition with the universal tendency toward complexity. We must begin listening to our intuition and cooperatively stop ruining the diversity of Life on which we depend or we might just destroy 200,000 years or more of progress in the universe.

It might help to think of intuition as a voice or feeling that guides you in the direction that is ultimately best for you as a member of the web of Life. However, the problem for most of us is that we don’t hear just one voice and know it as intuition. Rather, when considering how to act in any given situation we might find that human identity is a multiplicity. Even if we identify primarily as members of the web of Life, there is still a part of us that knows and identifies with logic and the ego. Therefore the question we must ask ourselves when trying to follow our intuition is not if we can hear it, but rather which voice is that of intuition in the midst of other voices representing a logical conclusion or our egotistic wants and drives. This can be a tough question to answer, but a trick to making it easier rests in where we ground our identity.

To explain this trick to being able to more readily hear and feel intuition, I will first share part of my own life. I have been learning and practicing Qigong, an ancient Chinese form of moving meditation, for just over a year and consider this practice to be the most important use of time in my life. Indeed, one of the primary reasons for the level of importance I have attached to this practice is that I feel it has helped me strengthen my ability to discern intuition so that I may follow it. When I was first learning Qigong, I remember relating to my teacher that “it is amazing just how much I get from this practice and yet how little I get about it.” Qigong is rooted in the epistemology of traditional Chinese medicine, which was completely foreign to my mind which had been trained primarily in the Western, logical tradition. Yet, without the slightest understanding of how it worked, I was experiencing an incredible feeling of centeredness during and after practicing. I was thinking less and appreciating more. By engaging in a practice which worked entirely outside of the bounds of logic, yet still provided me with very real results, I began to disidentify with my logical mind. I gave up the drive to explain what it was that I was doing, but rather joyfully submitted to my movements in the moment and I began feeling intuition more strongly. I started to feel and follow how my body and soul wanted to move rather than acting purely as a result of logical processing.

While it may seem imprudent to follow this feeling of intuition at the occasional expense of logic, I have had uplifting and fulfilling results from doing so. For instance, I spent last summer driving around the United States by myself. I drove nearly 11,000 miles alone, camping along the way and never staying in a hotel. You would sympathize with my father if you worry that a trip like this might have put me in harm’s way, yet rather than finding danger on this journey I was consistently met with serendipity. I practiced Qigong every day during this trip and feel very strongly that this practice helped me hear and follow my intuition, which allowed me to have the most fulfilling experience I’ve had to date. There were many days on this trip in which I woke up not knowing where I would camp that night, but by trusting in my sense of intuition, I never ran astray. One day I found myself camping alone by the East Rim of the Grand Canyon in an area that was not a formal campground. There was no one patrolling the area and, to my liking, no one to pay to camp there. After setting up camp, I drove back to a bathroom I had seen on my way in and passed a man and woman on the side of the road setting up camp about a mile away from me. Ordinarily as a lone camper, I would not have felt safe putting myself out there to two complete strangers, but I felt a strong intuitive pull to offer this couple to come and join me camping. After approaching them and explaining that I had found a campsite with a much better view and that I would love to have them join me, they followed me to my campsite and set up there. I was previously completely unaware that there was to be a solar eclipse that day and that I was about an hour’s drive north of the best place in the world to view this eclipse. Luckily, these new friends of mine knew exactly what time the eclipse started, had already scouted out the best place in the area from which to view it, and had with them a pair of glasses that allow you to stare directly into the sun. I was blown away by the experience of viewing the solar eclipse and ended up staying up late into the night sitting by a great fire sharing food and deep conversation with this wonderful couple. Had I given favor to the logical voice telling me it was not safe to approach strangers as a lone camper, I would have missed what I still consider to be one of the most amazing days of my Life.

I am not trying to suggest that everybody should begin fervently practicing Qigong and then traveling alone, but rather I feel that within these stories lies a trick and an assumption that might help individuals understand and embrace this intuitive approach. I believe the strengthened sense of intuition I have gained from my Qigong practice lies precisely in my disidentifying with the logical mind. By engaging in a practice which I could not explain or even comprehend and, more importantly, embracing how a practice that provided me with such real results works was beyond my comprehension, I was able to disidentify with logic and thus quiet the voices of logical processing in my decision making. Furthermore, as the ego is expressed through thoughts about a narrow sense of self and how to improve that self and Qigong helps me to think less generally, I find that it also helps me to quiet the voices that represent my egoistic wants and drives. I would like to point out that while these logical and egotistic voices have been quieted through my Qigong practice, they by no means have gone away entirely. Logic is still a tool I have at my disposal and the ego is certainly still an influence in my Life.

While the benefits I have found from practicing Qigong may not be readily applicable to your life, a genuine consideration of the predicament currently facing humanity offers a strikingly parallel entry point for adopting this intuitive approach. The convergence of the many planetary crises that we are currently facing is a problem far greater than any human can comprehend. Rather than approaching the state of our world from a place of supposing we can fully understand our situation, as occurs within our formalized educational system, I suggest that we openly admit this predicament is embedded in a system which is far greater than we can fathom. I am not suggesting we turn a blind eye to this predicament, but rather simply do away with the notion that we can conceive of a detailed solution to these problems. In recognizing and even celebrating these limits of our intelligence, I think we will find it a little bit easier to hear and follow intuition when deciding our actions moving forward. Furthermore, it is obvious we must act collectively and cooperatively if we are to build the sort of communities that will be resilient to the many troubles we are to face. In strengthening our communities, we will begin to identify more strongly as members of those communities rather than as separated individuals. I believe that in this re-seating of identity on the community rather than individual level, humans will find their identification with the ego will diminish which will further allow intuition to surface more clearly.

Just as the assumption that human intelligence is adequate for conceptualizing living systems fully enough to successfully impose abstractions onto material life underlies the logical approach embodied by our educational system, there is a large assumption that underlies the intuitive approach I am proposing. This assumption revolves around trust. In order to align your actions with the pulls of intuition, you must trust that your feeling of intuition is guiding you in a direction that will meet your best interests as a member of the web of life. You must trust that if you act in accordance with this universal intelligence that your needs will be taken care of. Because you are no longer identifying as an autonomous individual but rather as a piece of a larger, universal process, you must also accept that what you want may not be the same as what you need, but trust that what you really need will be provided for. This level of trust will require a leap of faith for all individuals and will certainly move most people outside of their

comfort zones, but I believe it will ultimately help humans live harmoniously with their environments and foster a much healthier Earth system.

If you find yourself resisting this proposed embracing of intuition I urge you to ask yourself whether this resistance stems from a genuine belief that it is wrong to hold trust without the assurance of knowledge, or if you simply find it too daunting to be comfortable in the midst of such uncertainty. If you feel the latter to be the case, take comfort in knowing that this transformation toward intuition will not happen overnight, but rather will be the result of your taking manageable steps in your own time, the first of which is as simple as admitting to yourself that you do not comprehend this world in its totality and you must act on what is uncertain.

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