# Be Here Now, and in a Thousand Years

*Toward A Tree-Crop Culture*

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The average American moves 11.7 times in a lifetime.
—United States Census Bureau, Geographic Mobility Report 2006

The best time to plant a tree is twenty years ago. The second best time is now.
—Japanese Proverb

It's not surprising that we still call this continent the "New World." Relative to the first peoples in America, who have lived here for about 3,000 to 15,000 years, we just got off the boat. And so far we don't seem intent on staying. We were taught in school that the American Frontier closed in the nineteenth century, yet the same boom-bust cycle has continued into the twenty-first, shifting from the Appalachians, to the Prairie, to the West, to the Rust Belt, to Silicon Valley, and the Sun Belt.

Now—finally—we're almost out of both places to live and places from which to extract our living. Our distant sources of labor, food, energy, water, and rare-earth elements are running dry. Africa won't feed China for very long, nor can Canada and the Amazon feed and fuel the United States for more than a handful of decades. Though we fled from distant lands to America, we continue to live much like refugees, constantly moving from one place to another, never staying long enough to cultivate the richest values possible in a specific place. In doing so we've traded uniqueness for the generic, culture for commerce. Even those of us who can afford to usually don't stick around long enough to harvest the fruits of our labor, nomads not seeking safety but "success."

Yet, we need the opposite kind of culture—a people that mean to stay.

Strangely, running out of places to go and resources to plunder may be what we need most. It's easy to wreck a place when you know you can move on to the next. Without another place to go, might we finally be forced to open our eyes to what's at hand? To gaze not at a distant horizon but at the ground beneath our feet? Then might we ask, "What can I do here? What can I make of this place?"

This transformation is inevitable and will happen whether we engage it or not; the earth is finite and we're spectacularly overshooting our resource base. This shift will also be not only personal but cultural.

"Staying" seems to be one of the key ingredients to a livable culture and to any civilization that can last beyond a few centuries, especially in the modern age. Rootlessness is simply not a viable operating system in a high-tech (high-footprint) world with billions of humans, and it begets a mind-set of conquest, a broken chain of cause and effect, not of accountability. Indeed "life, liberty, and the pursuit of happiness" seems hinged upon close feedback loops between action and consequence. That can only happen in a settled society, in cultures where "home" and community are central, where the individual is embedded in a long chain of generations, inheriting from those before, leaving for those who will come after.

Fortunately this pattern is hardly new. The instances in which human groups have sustained themselves in specific places for millennia occur where cultural and economic (resource) systems were organized not to maximize wealth for the individual but to grow and transfer value across

human generations. Not moving to the next place has been the only way we've built wealth enduringly. This kind of value takes decades and centuries to develop: barns spilling over with the autumn harvest, apples stacked high to last through a winter, disease-resistant crops from hedgerow to hedgerow, towering groves of nut trees, abundant herds of game, lush pasture and sturdy animals, vigorous people mastering their work, cultural memory. Human culture can create all of these conditions—even thriving ecosystems. But it takes generations of people skillfully committed to each other, and to a place, to do so.

Our task, then, at the dawn of the third millennium, is to transition from a society based in mining the most value as quickly as possible to a long-haul culture living not on the principal but from the interest. So, how do we develop perpetual, interest-bearing systems from which we can live? We can start by looking at those places where human inhabitation has lasted millennia—and to those who dwelled and did not despoil their homes.

In difficult dry regions of the Iberian Peninsula a complex agroforestry system based heavily upon the interactions between an oak-and-chestnut overstory and a grazed understory (using pigs and small cows especially), called the Dehesa system, was devised. Grazing animals were rotated through the woodlands with animals thriving primarily on the produce of the trees. The nuts offered a wellspring of fat and protein from year to year, with no pruning, no fertilizing (other than animal rotations), little disease pressure, no irrigation, and no bare soil, no erosion, complete groundwater recharging/moisture retention. This kind of land use is the opposite of desertification.

The productivity of the Dehesa system has been found to be a higher per-unit-area than any version of modern agriculture in Spain, when accounting for all inputs and outputs. At the same time, the quality of the systems' outputs is superior to those of modern agriculture: chestnut-fed swine has long been regarded as one of the finest meats in the world, as flavorful as it is dense in nutrients, beyond comparison to grain-fed meats. The savannah-mimicking Dehesa silvo-pastoral systems were so widespread, evolved, and practiced for so many centuries that until the twentieth century many ecologists did not recognize the anthropogenic origins of these ecosystems. As the agroforestry practices of planting, cutting, pruning, and grazing waned in the modern era so, too, has the diversity of "wild" life in these woodlands, while springs dried up, soil-building slowed, and the region has become more arid, brittle, and less productive.

In what is now California, the Sierra Miwok, Yokuts, Chumash, and at least a dozen other first peoples developed perennial, fire-managed ecosystems that grew a stunning abundance of game along with medicinal plants in the understory of black oak–dominated woodlands. Peoples in California also developed systems based around sugar pine, hazelnut, and other masting and often exceptionally long-lived plants, using fire, transplanting, and selective cutting rather than grazing (having none of the domestic-able animals available in Eurasia). In the Sierra Nevada Mountains individual sugar-pine groves were often tended to by single clans, climbed and harvested for a dozen or more human generations (sugar-pines can yield rich pine nuts for 300–500 years). Imagine harvesting food from a tree that your great-grandfather planted, that your grandfather then climbed to harvest nuts from, that your father climbed and rested beneath, whose seeds your mother made a flour from to nourish you, that your son will feed your grandchildren from, that your grandchildren, when the tree dies, will use the wood for shelter, the inner bark for medicines, the resin for fire-starter, the needles as incense in a ceremony for the tree and for the lives which the tree made possible. Such is the life of a people who live close to trees, intentional in their legacy.

Over a period of at least one hundred human generations those dwelling in eastern North America guided the development of vast food forests. The Wabanaki, Algonquian, and Mahican peoples, the Abenaki, Huron, Iroquois, Manhattan, Massachuset, Narragansett, Penobscot, Seneca, Shinnecock, and others promoted an intergenerational food, fuel, fiber, and medicine ecosystem whose foundation was the mast-bearing tree: oak, walnut, hickory, chestnut, butternut, pine, beech, hazelnut (they did not yet have the apple from Asia).

The earliest European accounts of this land describe an open "park-like understorey, everywhere growing oake and walnut." These visitors thought they had encountered an unusually beautiful wilderness. But, as has become clear, this was no wilderness, but a continental-scale forest garden whose crops were trees, the game they sustained and understory plants. As in other regions of the world where cultures figured out how to dwell for thousands of years in a single place, the tools and techniques of choice were fire, hunting, selective cutting, promoting the largest, most-useful seeds, and dispersing them (think Johnny Butternut) and a deep awareness of seasonal cycles to properly time these activities.

Why are trees—especially nut trees—at the basis of these regenerative land use systems and highly adapted human cultures? In the simplest terms, it has to do with inputs and outputs. A nut tree is simply more effective and efficient at converting sunlight and precipitation into value, over the long term, than any other technology humans have yet designed.

This becomes clear when comparing biological systems in general with nonliving technologies. Consider a photovoltaic panel or wind turbine. Each requires large and damaging inputs to generate single outputs. What are the inputs for a photovoltaic panel? Bauxite from which to smelt the aluminum frame, silicon and numerous other minerals (many only found in difficult-to-access and a dwindling number of places on the planet), and myriad other mined and smelted metals and minerals. These all must be mined, transported, refined, transported again, then fabricated, then shipped again. All for one output: electricity.

What are the inputs required for a nut tree? An exchange between breeder and planter, transporting of the seed or seedling, some woodchip mulch, rain, and sunshine. And time. What are its yields? Oxygen, soil, wildlife food and housing, moisture retention, carbon sequestration, air filtration, human food, stock feed, building materials, shade, windbreak, and beauty, to name a few.

The former resource path—the abiotic—provides us with a practical service at great cost. The latter, biological (or "soft") path creates an enduring and generative legacy of positive value. And whereas a solar panel or wind turbine or green building offers diminishing yields over time, a nut tree's output actually increases, for at least the first century or two of its lifetime.

Such is the power—and imperative—of biological systems: They are the only means we have of sidestepping entropy, at least for significant periods of time, on this planet. That's what tips the balance; it all comes down to capture, storage, and transfer. The best system is the one that can harvest the most sunlight and moisture, then store that value for the longest period of time while converting some of it into products and services that other living things, like humans, can use. And biological systems do this very well, while nonliving mechanical systems cannot.

In the modern era enough research has been done to quantify the advantage of cropping with trees over annual crops. Accepted yields for chestnut, for example, are 800 to 1,500 pounds per acre. That rivals modern corn production on deep-soil land. However, corn only produces such a crop with constant labor and fertility inputs each year while reducing the land's capacity to produce due to its erosive forces on the soil. A chestnut orchard, on the other hand, actually improves the land's (and climate's) capacity from year to year while it yields; it requires no bare soil or fertility inputs, and it produces hundreds of annual yields from each plant on marginal/shallow-soiled land (far more of the earth's cover type than deep-soiled land), while taking up less space than corn. As well, you can crop the same area with other species simultaneously: e.g., a chestnut orchard is also a pasture, also a game preserve/farm, also a place for understory berries and medicinals.

All in all you can grow about three to eight times the product value (protein, fat, carbohydrate, BTUs and other nutrients/values) via a tree-crop system like chestnut than an annual, input-dependent crop like corn, and you can do so while improving the land from decade to decade. Annual cropping, year after year, always leads to a ruined soil and culture. Mesopotamia, much of Greece, and many other empires were once forested; now they are deserts.

Despite abundant human cleverness we haven't invented a better way to store energy than a stack of firewood. We haven't yet devised a more effective means of capturing solar energy than by putting up a cow and hay in a barn through the winter. Biological energy harvesting and storage is what has allowed us to survive to this point, and our experiments of replacing biological systems with mechanical and chemical systems have at best been delayed catastrophes. We must rely on nonbiological aspects (the barn in the above example), but wherever we do we compromise the system and our own returns in the long term. The minute a barn is built it begins to decay. The famous comparison of a tractor with a draft horse highlights the entropy principle at work here: A tractor and horse are comparable in the amount of work they can achieve on a small piece of land, yet after a time the tractor dies and the horse makes another horse. Only life processes are regenerative. As such, our prospects for thriving on this planet depend upon our ability to partner with life forces.

Life, however, can be slow. Who can wait decades for a return on investment? Actually, most of us do already: pensions, Social Security, mortgages. A nut tree beats an IRA, hands down, on a strictly monetary basis alone (not counting all the side yields). Indeed, one could consider such an investment a "collective retirement account," maturing in 10–30 years and yielding ever-increasing returns for its first 100–200 years at least. Stone (nut) pines (which populate huge swaths of the Siberian taiga and are amenable to Vermont's climate and soils) often bear for 400 years. Go gamble on Lehman Brothers for a 100-year return.

Your apple tree, however, can easily do that. Planted for $100 and tended to at a cost of $50 per year, in your time the tree will yield roughly 50,000 pounds ($150,000 worth at $3/pound) of fruit in its first century—a total return on investment (ROI) of 2,841 percent and an annualized rate of return of 7.1 percent (almost exactly the same as a 50/50 bond/stock portfolio over the last 100 years). If you didn't count your time pruning and harvesting, and chalked that up to family fun, your overall ROI would be 150,000 percent in 100 years. Over 50 years your A.P.R. would be 15.8 percent—not slow money.

Trees are one of the only financial instruments we can rationally depend upon for long-term returns on investment. Perhaps this is why humans have invested in trees for millennia and in banks for a brief moment in time. Unlike an IRA or Social Security, barring a lightning strike your family's nut tree carries a guarantee that the U.S. Treasury simply can't make (even if it wasn't bankrupt); it simply hasn't been around long enough.

One can find mature nut trees today that started yielding before the United States existed. Similarly, one can plant a tree today that will likely be bearing after this nation's life span is over. On the thousands of pounds of value falling from your tree year after year, you will pay not a cent of tax. The value is all for you—and for the squirrel, the owl, the soil, the groundwater, the climate, and your children.

Imagine inheriting a food forest. Imagine creating one. Planting season begins when the ground thaws and ends at leaf-out. Your intergenerational legacy can begin today.