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Trees in Themselves

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The oldest trees prompt us to think about how embedded we are in time and could help us recalibrate our perspective on the geologic past.

Andreas Eriksson/Private collection/Stephen Friedman Gallery, London

Andreas Eriksson: *Tree Trunk*, 2013

Reviewed:

Elderflora: A Modern History of Ancient Trees
by Jared Farmer
Basic Books, 432 pp., $35.00

In the past, when a candidate for the title of the world's oldest tree was discovered in the United States, many predictable things tended to happen, varying slightly by historical era. The tree was usually found on land that had been given away or sold cheap by the federal government—and then had to be repurchased at very high cost. If the tree happened to be on ancestral indigenous land, someone invented racist, pseudo-indigenous fictions to lend the tree an aura of romance.

Scientists examined the tree, and now and then one of them behaved badly. A road was built to the tree. Visitors flocked there, and in so doing they compacted the soil and damaged the tree's root system. They carried away branches, leaves, needles, cones, pieces of bark—whatever they could take. They carved their names on the trunk and nailed signs to it. Vandals tried to set fire to the tree or cut it down. Falsehoods, exaggerations, and factual errors were repeated (and reprinted) long after they'd been discredited.

Eventually the tree was forgotten, because an even older tree had been found. Or it succumbed to natural or unnatural causes and was turned into key rings, ornaments, souvenirs, museum samples, and tabletops. If the tree was cross-sectioned into slabs for public display, the timeline marked across its rings was likely to reveal a Christianized history of white Western "progress"—a timeline the historian Jared Farmer calls "a totalizing meta-narrative"—which terminated, of course, in a dead tree. All of this I conclude from reading Farmer's absorbing new book, *Elderflora: A Modern History of Ancient Trees*.

"Curiosity, care, negligence and despoiling": those are the human habits that surface in the presence of "the latest oldest tree," according to Farmer, whether it's a giant sequoia in one decade or a bristlecone pine in another. It's as though the ancientness of the trees provides a maypole around which humans can perform their characteristic dance. And here's what makes it all the stranger: the atoms in an ancient tree and those in a human being are equally old, formed billions of years ago in the big bang and the early universe. Only the evanescent, organismic shapes those atoms take, as tree or human, can be said to differ in age.

Since we're unable to feel the atomic ancientness we're actually made of, we imagine that the world's oldest tree is "a bridge," as Farmer puts it, "between temporalities we feel and those we can only think." We visit the vicinity of the world's oldest tree to become aware of time as a substance and, Farmer suggests, because it grants us "emotional access to timefulness." But that's a little peculiar. You may feel small standing next to a lofty coastal redwood. But next to an ancient pine, do you feel brief? After all, the present enfolds you both. Farmer may have this wrong. To *feel* the temporality of an ancient tree, you have to think it first, which is what *Elderflora* is meant to help us do.

"Old Ones can be found everywhere," Farmer writes, "if people take time to look." But how do we know they're actually old? That's one of the central questions in *Elderflora*—a question that illuminates the transition from the legendary to the factual, from oft-told but unprovable stories to verifiable physical proof (or disproof) of a tree's antiquity.

Naturally, some kinds of trees live longer than others. Only about twenty-five species—mostly conifers—are capable of living more than a thousand years. Farmer calls these "perdurables," and most of them tend to be "longevous on two scales"—in evolutionary age and biological age. Some tree species are also much better than others at providing proof of their elderliness. The trunk of an ancient yew in an English churchyard has probably hollowed out over time, leaving almost no usable evidence of its age. Olives and ginkgoes and baobabs also hollow out as they get older, and they have all been revered for their timelessness.

The oldest individual trees found so far[1] are, famously, Great Basin bristlecone pines (*Pinus longaeva*), which live on a few windswept mountains in California, Nevada, and Utah. They're gnarled and tortuous in form, superb examples of what the dendrochronologist Edmund Schulman, who first analyzed them in the early 1950s, called "longevity under adversity." What makes them scientifically important isn't only their great age but the amount of data they yield, including their growth-ring record and the "chemical compounds in the wood and in the variable-length needles, which persist on branches for decades as records of photosynthate gains and losses." The tree-ring samples that bristlecones yield when cored[2] reach back almost five thousand years in the oldest specimens, and they show a remarkable sensitivity to "climatic signals," including spikes in the isotope carbon-14. It's a striking coincidence that bristlecone pines are so data-rich. "It almost seems miraculous," Farmer writes, "that the longest-living individual plants on Earth have turned out to be perfect for Earth system science."

In his previous book, *Trees in Paradise: A California History* (2013), Farmer remarks that "botanists don't define trees; regular people do." In other words, "tree" isn't a precise taxonomic category. It includes many kinds of plants with many kinds of growth strategies—and many ways of growing old. Like redwoods, ginkgoes, and olives, a venerable yew, for instance, is capable of remarkable feats of regeneration, including the ability to regrow from almost any of its parts, even after catastrophic damage. "These trees," Farmer writes, "never lose their ability to resprout and regenerate.... In theory, such a plant is internally capable of immortality, though some external force inevitably ends its life."

In a sense, bristlecone pines have sacrificed the yew's vigorous, multifarious, nearly perpetual regenerative capacity for a way of growing that's better suited to their stern habitat—and to inscribing their history within themselves in the form of tree rings. They live through

> sequential, sectorial deaths—compartmentalizing their external afflictions, shutting down, section by section, producing fertile cones for an extra millennium with the sustenance of a solitary strip of bark.

Chemically, Farmer writes, bristlecones "are off the charts," full of the resins characteristic of conifers, which help preserve the trees against fungus and insects. And because they live in high, dry, cold, and windy places, they routinely endure stress that would kill trees of other species. They attain great age not despite their habitat but because of it. (That's the meaning of longevity under adversity.) And their growth rings preserve a high-resolution chronicle of climatic conditions during their life span. It's as if they were scientific instruments set in place fortuitously some five millennia ago.

Every ancient tree, Farmer writes, raises a question that's as philosophical as it is practical: "Does a naturally occurring tree of great age have value in itself?" The critical words are "in itself." As interesting as a tree-ring record may be on its own, its scientific value fully emerges only when the patterns from many tree-ring records in a climatic region are compared and coordinated and pegged to known calendrical dates.

Scientifically, ancient trees "speak collectively as populations," Farmer notes, after their data has been gathered and smoothed—not as individuals. When their evidence is cross-referenced with evidence from glacial ice cores reaching much farther back in time (as well as from other calendrical tools in other scientific disciplines), the result is an ability to study climatic history with surprising precision—and often with absolute rather than relative dating.[3] Much of what scientists know about Earth's earlier climates—essential for understanding anthropogenic climate change—derives from dendrochronological research. That's one of the values of an ancient tree.[4]

But humans don't experience a "perdurable" like a bristlecone or a sequoia "as populations" or as sets of data points. We experience what Farmer calls "their individual arborescence—their personhood," a word that sounds almost like a leap into Tolkien's fantastic, arboreal world. When it comes to trees, Farmer argues, personification isn't just a kind of category error, a sideways slip into fiction or myth or metaphor. "Personification is intrinsic to treeness," he suggests, because trees tend to resemble "a person-like being: an individual with torso and limbs." Anthropomorphizing trees isn't only a modern tendency. As Farmer notes, "plants misunderstood as individuals have had cultural standing for millennia." This has usually meant understanding "treeness" in terms of humanness.

Farmer envisions a different kind of ethical kinship. He wonders, quizzically rather than hopefully, whether humans can mature into a different sort of "plant thinking," one that doesn't depend on "a special bias for trunks," especially the trunks of very old trees. Perhaps, he writes,

> people could learn to relate to these modular, social, communicative beings on their own multitudinous terms, including sexual, unisexual, and asexual reproduction, in all kinds of forms, big and small, trunked and shrubby. Biological treehood, and the fullness of tree time, could at last supplant anthropomorphic treeness.

Farmer also imagines elder trees helping us to recalibrate our perspective on the geologic past, which, he argues, is deformed by "an overemphasis on dinosaurs." We don't "see the big plants among the big lizards; the leaves are too familiar."

You might infer from Farmer's line of thinking that elderflora actually have more value in relation to humans than they do in relation to organisms within their natural ecosystem. That's not entirely wrong. Commercial foresters, of course, think of trees in terms of their lumber yield, and from that perspective, ancient trees tended to be considered "'overage,' 'overmature,' and 'decadent.'" We're also beginning to understand that living trees do things, like sequestering carbon and linking together mycelial networks, that are far more important than their economic value as dead lumber. Farmer writes that "the only 'ecosystem service' a mature sequoia provides that other Sierra conifers cannot is nesting habitat for reintroduced condors." And yet they also provide "temporal services for modern people." Ancient trees, Farmer argues,

> are ethical gift givers. They invite us to be fully human—truly sapient—by engaging our deepest faculties: to venerate, to analyze, to meditate. They expand our moral and temporal imaginations.

Since the enduring well-being of nature itself—if not its actual survival—now depends wholly on the attitudes of modern people, it may be that the *emotional* services ancient trees offer us should be folded into the broader concept of "ecosystem services."

It's not surprising that we honor the uniqueness of the world's one oldest tree—the single bristlecone pine that holds the record for longevity and whose exact location is therefore kept secret to protect it. We instinctively relish superlatives. But there are old trees everywhere—old for their species, old for their habitat, old for their immediate neighborhood, and often far older than humans think they are.[5] Biodiversity is usually understood in terms of species richness.

But to Farmer—and to many ecologists—temporal richness matters almost as much. In other words, chronodiversity is an essential aspect of biodiversity. If we have trouble imagining this, it's because we habitually think of trees as individuals, person-like, not as members of interconnected communities and rich interspecific and intergenerational associations high in the canopy and underground. Old trees are the hubs of those communities.

It's hard for humans to notice chronodiversity, even in places where it's sure to be found. (Plain old diversity is hard enough. Most people have trouble telling a beech from a birch.) It's harder still to notice what you might call demographic diversity within a forest. Tree species grow old in different ways, and the correlation between a tree's size and its age varies from species to species. It's one thing to know how old the trees are in a stand that was planted all at once after clear-cutting a forest. But it's entirely different trying to grasp the chronological complexity of an old-growth forest, where "one-quarter of the trees…will be triple or quadruple the median age, and one-one-hundredth will be ten or twenty times the median age." Chronodiversity isn't just an aspect of biodiversity. It also "aids biodiversity." What matters isn't simply the statistical variation of ages in a forest. It's the way those differently aged trees work together. It's worth remembering that, as Farmer writes, "each Old One represents a specific moment in the past—a matrix of favorable conditions that existed upon establishment, and may not recur for centuries."

A living tree embodies a genetic heritage and a climatic heritage. And, as in human communities, every different age group in the forest has its part to play—not on its own but in relation to all the others. "During a seedling's precarious recruitment phase," Farmer writes, "the cooperative assistance of a big old tree may mean the difference between death and a long, long life." Farmer calls clear-cutting old-growth forests in British Columbia or the Amazon "ecocide," and for good reason. The globalized Western rapine of the natural world has a habit of leaving behind only monotonous, even-aged, "reforested" plantations wherever we have been—nothing older than the date of our most recent, violent economic incursion.

Consider the case of Brazil nut trees (*Bertholletia excelsa*) in Amazonian forests. Genetic and demographic evidence suggests that they've been spread by humans for millennia, as part of a culture of agroforestry. But the age structure of existing Brazil nut trees, Farmer points out, is top-heavy—most of the trees date to the sixteenth and seventeenth centuries, with few trees now entering maturity. And why? "The missing stands of trees represent missing cohorts of people," who died in the immediate aftermath of European contact. Those ancient Brazil nuts (*castanhas* in Portuguese, though one would like to know their ancient indigenous names) are still bearing witness, after four or five hundred years, to the destruction of the people—the families and societies—who planted them one by one.

We live in a universe full of temporal signals, everything from a faint red blur of a galaxy 13.1 billion years old to the complex set of signs—some vivid, some nearly indiscernible—that tell us high autumn is here. We inhabit bodies that are wholly embedded in time, which can feel like an erosive friction, if you choose to pay attention to it. Many of us choose not to, even though we notice—when we name the decade we were born in—how long ago that now sounds. And yet nothing is new. In a way, we make a mistake inherent in the Western version of our species when we think about "the world's oldest tree," a mistake that's easy to capture in an imaginary headline: "New Oldest Tree Discovered." If you were able to stand beside that tree—whatever kind it happens to be—you would have to work hard to admire something more than the number associated with it. You would have to work hard to *see* the tree itself.

As for feeling the tree's age, I think what we feel isn't a quality that's inherent in the tree itself. We feel, as in a time lapse, the changes that take place as the world's centuries whir past in that one location. That's the kind of imagining we're good at. We're no better at feeling the long time of an ancient tree—the second-by-second, day-by-day of its existence—than we are at feeling the long time of evolution itself. It's a truism that humans aren't very good at comprehending large numbers. But it's amazing how hard it is to imagine even small numbers when they're applied to the literal passage of time. Five thousand years (a bristlecone) is nearly as hard as 13.1 billion (a galaxy).

What we could be imagining when we think about the long time of ancient trees isn't the number of human generations they've been coterminous with. We could be admiring a difference between living organisms—utterly distinct and yet closely kinned—that's as beautiful as it is mysterious. Is time in a bristlecone the same as time in us? If that were an equation, you could factor out "time," leaving this question: Is a bristlecone the same as us? In every important respect, I think, the answer is yes.

Letters:

David H. DeVorkin

Written in the Stars

April 20, 2023

Verlyn Klinkenborg

Verlyn Klinkenborg's books include *Several Short Sentences About Writing*, *The Rural Life*, and *Timothy; or Notes of an Abject Reptile*. (March 2023)

1. As distinguished from clonal clumps of trees, like the great aspen colony called Pando, in Utah. ↩

2. Using a tool called an instrument borer, which removes a thin cylinder of wood without harming the tree. This works far better on a trunk of small diameter—like a bristlecone pine's—than on the massive trunk of a sequoia or redwood. ↩

3. A good example is a recent study from the Laboratory of Tree-Ring Research at the University of Arizona, which correlated data from ice cores and bristlecone tree rings to correct the probable date of the Minoan eruption of Thera, circa 1600 bce. ↩

4. Among the things ancient trees have to tell us, according to Farmer? "The period from 1850 to 1950—California's first century as a US state—exhibited the lowest frequency of drought for any hundred-year period in the last two millennia. In other words, Euro-American settlers reaped the rewards of the dumbest luck." And: "Using tree rings as proxies for snowpack and summer soil moisture, scientists determined that this twenty-plus-year period [from 2000 to 2020] was the driest in the Sierra Nevada since 800 ce." ↩

5. A good example is northern white cedars growing on the Niagara Escarpment in Canada. Everyone had assumed they were regrown from a forest that had been cut down around 1850. In fact, they were around five hundred years old. Ten cedars growing in cracks or on cliff ledges were more than a thousand years old, including one that dated to 688 ce. ↩