

## The New York Review of Books

### The Forest's-Eye View

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Two new books investigate the ways in which deforestation affects climate change, and climate change affects forests.



Karen Radford: *Untitled*, 2021

#### Reviewed:

##### Ever Green: Saving Big Forests to Save the Planet

by John W. Reid and Thomas E. Lovejoy  
Norton, 302 pp., \$30.00



**The Treeline: The Last Forest and the Future of Life on Earth**

by Ben Rawlence

St. Martin's, 307 pp., \$29.99

Where I live is edged to the south by a treeline: red maple, sugar maple, red oak, white pine, two kinds of hickory. Beyond the treeline lies the forest. It isn't a named forest, and it clearly isn't forest in the historic sense: royal land (wooded or not) preserved for hunting. It's protected only by private ownership and the extraordinary power of benign neglect. And yet the network of trees just beyond my office is connected to thousands and thousands of acres of more or less contiguous forested land across the northeastern United States. This is a forest reforested—merely by letting it grow—from the bare sheep hills and small farms of the mid-nineteenth century, when this region's native old-growth forest had been cut to the ground by settlers of European origin called Americans.

In mid-May the air is heavy with tree pollen, and the leaves are still unfolding, still bright, still soft. On a warm day, it's easy to imagine a photosynthetic vapor just above the leaf canopy, where carbon dioxide and oxygen are being exchanged again, after a winter lull, in what one writer calls “a biology of light.”<sup>1</sup> Walking into the woods, I'm always aware of living at the bottom of an ocean of air, where trees can climb as high as they do because the atmospheric pressure is so slight. In the hush of boughs and branches overhead and the trunks they spread from, an endless capillary flux is going on—water moving from earth to sky. It's as if this were a columnar sea.

Deep in the forest, I often think about a passage written in 1800 by Alexander von Humboldt, the great German scientist, while he was exploring the upper Amazon. In *On the Origin of Species*—published in 1859, the year Humboldt died—Darwin implied that humans aren't a special, separate creation of the God they worship. In evolutionary terms, we're a species like any other. But on the “uninhabited banks of the Cassiquiare, covered with forests, without memorials of times past,” Humboldt considered an even starker possibility. Perhaps humans aren't “essential to the order of nature.” To him, “this aspect of animated nature, in which man is nothing, has something in it strange and sad.” What Humboldt sensed is that without “man,” nature lacks purpose. And he was right, but only because “purpose” is an exclusively human consideration, which we carry like a philosophical virus. The biological functions of trees—including photosynthesis and the capture of carbon—are essential to our continued existence. But that's not their purpose. Forests exist only for themselves.

The forest outside my office has no economic “purpose” these days. Nothing gets removed—neither logs nor firewood—and so it's tangled and dense, a little like old growth, which it may become in another few hundred years. A huge gray birch leans against a hickory half its diameter, waiting to topple one day. A mature hemlock stretches its

length along the ground, its massive root-plate tipped up to the perpendicular, exposed at the edge of a vernal pool. Fallen trees, colonized by fungi and other detritivores, are crumbling into humus. The forest receives itself, capturing leaves and needles and acorns, limbs and bark, rain and snow. Whatever falls is buried by whatever falls next. There are no paths—not for my feet, at least.

In the forest, I always notice how oddly human I am. I can walk about with intention, unlike an oak. I'm not bound to earth by the beech roots submerging nearby. Nor am I woven into the mycelial network knotting the trees together in an underground web, connecting root tip to root tip fungally. And though I'm a biological community myself—a holobiont of some ten thousand species and trillions of microbes in a body of human cells—I can't directly sense the diversity of my communal self. I tend to see the things that seem to resemble my own separateness and individuality, no matter how mistaken my ideas of self—or forest—may be. I notice charismatic trees—a lone chestnut oak or a spectacular beech—rather than liverworts and lichens or the intricate imbrication of habitats and species. That's a mistake many of us make. Economically, we value trees and the forests they come from almost exclusively for their wood. From a forest's-eye view, that's both absurd and characteristically human. But it's characteristic of only one way of being human, in just one epoch of human existence—the one in which we're struggling to keep ourselves from burning it all down.

**N**o one with any sense disputes that climate change, as we're experiencing it now (with worse to come), is caused by human economic activity.<sup>2</sup> The most recent report from the Intergovernmental Panel on Climate Change (IPCC) calls the connection “unequivocal.” But few forms of anthropogenic agency are more apparent than the intentional destruction of forests. When an old-growth forest like the Amazon is cut and burned and turned into savannah—whether to make way for cattle, annual crops like soybeans, or short-term subsistence farming—a largely unexamined wealth of biodiversity vanishes, as well as the lifeways of indigenous peoples for whom the forest has always been home. With it goes the carbon the forest has been storing for ages, plus the forest's inherent capacity to sequester carbon and release oxygen through photosynthesis. And as the forest goes, there too goes any chance of understanding its effect on the atmosphere and Earth's climate.

The pressing question for most of us isn't only what to do about deforestation. It's how to *know* about it. The reporting is sometimes inaccurate or ill-informed or willfully prejudiced. The science can be contradictory, often for lack of meaningful data, though the broad conclusions are starkly clear. Dozens of governmental and nonprofit studies are available, and there's an increasing number of online tools for keeping a nearly real-time watch on the world's forests.<sup>3</sup> The scale of deforestation around the world is also overwhelming, and political

conditions are constantly shifting. A few years ago, Brazil was doing a remarkable job of slowing deforestation. Now it's an environmental disaster zone, thanks to its president, Jair Bolsonaro.

The best current overview of global forest health can be found in a new book called *Ever Green: Saving Big Forests to Save the Planet* by the biologist Thomas E. Lovejoy and the economist John W. Reid. There's no better or more readable guide to the bewildering array of threats to forests or to the economic and institutional programs created to protect them. Lovejoy died at the age of eighty on Christmas Day 2021, while *Ever Green* was still awaiting publication.<sup>4</sup> It's a fitting posthumous tribute to his research and influence. Lovejoy spent most of his life working at the nexus of science, policy, and conservation, and *Ever Green* evokes his temperament. It's skeptical and cautious, as needed, about the mechanisms of environmental protection—what works and what doesn't. It prizes indigenous knowledge and indigenous guardianship. It's also relentlessly optimistic, as Lovejoy was, about the value of saving forests—and patiently hopeful about the chances of doing so.

In 1979 Lovejoy began a series of long-term experiments in the Amazon to study the effect of landscape fragmentation on biodiversity. With government support, he was able to protect five rainforest plots, from 2.5 to 250 acres, on Brazilian ranches that had been carved out of the Amazon. (There were also control plots in undisturbed forest.) Over the years, one species after another—black spider monkeys, white-plumed antbirds, and white-lipped peccaries, for example—abandoned the isolated ranchland plots. Even the largest was far too small to support anything like the diversity of species that had once lived within it. And because these jungle patches had edges—unlike unfragmented, contiguous forest—they were “hotter and drier, with great mats of desiccated leaves from trees either dying or losing foliage to wind.” That made them more susceptible to drought and wildfire. What Lovejoy discovered experimentally has since been borne out over and over again. Fragmentation is disastrous.

Lovejoy's experiment also helps us understand the forest carbon cycle. There's a positive correlation between a forest's overall biological diversity and the amount of carbon it stores. “The ecosystems densest in carbon are forests,” explain *Ever Green's* authors, “and of these, the most carbon rich are those least disturbed.” Add to this the fact that unfragmented forests are biologically more diverse than “jungles pierced by roads and hemmed in by farms,” and you come to the central tenet of *Ever Green*.

To stand a chance of keeping climate change within tolerable limits, we have to protect the largest forests on Earth, which Reid and Lovejoy call “megaforests.” There are five of them. Two belong to the boreal zone: the Taiga, mostly in Russia, and the North American megaforest, in Alaska and northern Canada. The other three lie in the

tropics: the Amazon, the Congo, and the rainforest of New Guinea. Together the five contain most of the planet's approximately two thousand remaining "intact forest landscapes," a phrase where "intact" means "at least 500 square kilometers...free of roads, power lines, mines, cities, and industrial farms."

At the heart of *Ever Green* is a kind of logical cascade—"the logic of saving forest to save the planet." Megaforests sequester and store carbon, which, if released, would add catastrophically to the atmospheric greenhouse gases causing climate change. They also generate oxygen and have important effects on the global water cycle—hugely crucial benefits. Forest areas that are least impaired by human activity not only store the most carbon but are the most biologically diverse. Size also makes an enormous difference: the larger the intact forest, the better. Plus, as size increases, "the cost of protecting each acre plummets."

Old-growth forests, like those at the intact core of the megaforests, are irreplaceable on a human time scale. There are no good arguments—economic or otherwise—for turning intact forest into pasture and cropland. (Bolsonaro's implicit argument is inherently political—a paranoid fiction of foreign takeover in the Amazon and a politically useful, and familiar, rhetoric of antienvironmental, antiscientific, far-right "populism.") In the long term, the climate and biodiversity benefits of healthy, unfragmented forests vastly outstrip the short-term economic value extracted through logging, farming, and mining. And there's a fundamental ethical argument against deforestation as well, an argument that the West discarded long ago but that needs to be reimaged and embraced. Every organism in the forest has the same right to exist as humans have. This is an understanding embodied (though not in the language of "rights") in most forms of indigenous knowledge. Not surprisingly, "Indigenous forest carbon is more secure, by a factor of six," as the authors write, than areas protected only by the state.

**S**aving forests is what *must* be done—though clearly not the only thing. According to the IPCC, forest loss needs to stop completely by 2030 in order to keep warming within 1.5 degrees Celsius by the end of the century. Reforesting is also required,

because around half of the 900-plus billion metric tons of animate carbon stored in preindustrial ecosystems has already been loaned to the atmosphere. Some of it must be brought back into the biosphere to make the math of climate stability work.

But planting trees for commercial harvesting in short-term rotation—conventional forestry, in other words—isn't really reforesting, and it won't change the carbon equation.

There are ambitious noncommercial plans to ease climate change by planting astonishing numbers of trees. There's the Trillion Tree Campaign, run by a foundation called Plant-for-the-Planet. New Zealand is planning to plant a billion trees by 2028. Diana Beresford-Kroeger, the Irish-Canadian botanist and writer, has proposed to "stop climate change in its tracks" with a "bioplan" in which every person on Earth plants one tree per year for the next six years. These are good ideas. But some 30 billion trees are cut and burned—intentionally and in wildfires—every year, and no amount of tree planting will restore what's lost when old living forests are destroyed. Planting trees in immense numbers while cutting and burning forests looks like a terrible version of the Red Queen's gambit: "It takes all the running *you* can do, to keep in the same place." Only it isn't the same place. Every acre of intact forest took centuries to develop, centuries to store the carbon it contains.

Stopping deforestation means overturning entrenched economic and cultural patterns, and reducing the consumption of forest products. It means dealing with global inequity—especially the imbalance between highly developed countries where atmospheric carbon is produced and the relatively undeveloped countries where it's stored. Above all, it means halting the building of roads, which Reid and Lovejoy call "the single most important factor" in forest conservation.

To do all this, a remarkable number of incentives, programs, and prohibitions have been devised. And this is where *Ever Green* is especially valuable. There's very little pleasure in trying to find your way through the acronymic world of conservation organizations, government protocols, or United Nations policy directives. There's even less in trying to read the inevitably jargon-laden language of, say, the Working Group III report called "Climate Change 2022: Mitigation of Climate Change"—which is a subunit of the IPCC's Sixth Assessment Report.

Reid and Lovejoy digest and synthesize this mass of information, singling out the approaches they think will matter most. The range—and the readability—of explication in *Ever Green* is unusual. The book is as good on the effects of marginal analysis as it is on the nature of indigenous languages. In the Kaska tongue, for example, spoken by the Kaska Dena people in Canada's Northwest Territories, the equivalent of the English noun "forest" is a prepositional phrase. It "isn't an object," Reid and Lovejoy write; "it's a situation, a phenomenon brought about through a relationship involving a person and a place."

What matters isn't how we define or conceptualize the forest. It's how we know it and how that knowledge binds us to it. And in explaining the range of conservation work being done, Reid and Lovejoy always bring the reader back to the living forest—on the ground, guided by someone like Tamasaimpa, a member of the Brazilian Marubo people. As a young man he was sent to the nearest town to be educated. When

he returned to his village, he got to know an elder, named Pëxken, of the Korubo tribe, which had only recently emerged from the forest. Of Pëxken, Tamasaimpa said, “He and the environment are the same thing.”

To the reader, the authors give this advice: “Go see a big forest!” Despite the exclamation point, there’s no naive optimism in this book. Its prognosis is positive, but muted. It’s impossible to read *Ever Green* without being moved by the vision and commitment of the people—including its authors—who’ve devoted themselves to protecting the world’s forests.

**B**en Rawlence’s *The Treeline: The Last Forest and the Future of Life on Earth* is a nearly perfect pendant to *Ever Green*. It’s a bleaker book, not apocalyptic and yet almost never reassuring. Rawlence is a British writer and a former researcher for Human Rights Watch in Africa. His two previous books are both excellent: *Radio Congo: Signals of Hope from Africa’s Deadliest War* (2012) and *City of Thorns: Nine Lives in the World’s Largest Refugee Camp* (2016), which examined an enormous Kenyan camp complex, called Dadaab, for displaced Somalis—a refugee city of nearly half a million people when Rawlence knew it. Until *The Treeline*, the natural world has mostly been a backdrop to Rawlence’s skillful, often difficult reporting. He’s been more concerned with the damage humans do to one another than the damage they do to the environment, although several scenes in *Radio Congo* illustrate the widespread trade in illegal charcoal from protected forests.

Rawlence’s subject is the circumboreal treeline, which includes the northern edge of two of the megaforests described in *Ever Green*: the Taiga and the North American megaforest. What he explores isn’t so much a linked set of places as a linked set of moments in time. “In modern usage,” Rawlence writes, “the term ‘treeline’ has come to mean a fixed line on a map indicating the growing limit of trees”—a climatic limit by altitude or, in this case, by northern latitude (and nothing to do with the treeline where forest meets cleared land). But since the end of the last ice age, “there is scarcely a patch of the northern hemisphere over which the treeline has not passed.” To him, our modern use of the word demonstrates “the very narrow time horizons of humans, and...how much we have come to take our current habitat for granted.” In *The Treeline*, Rawlence moves around the boreal forests in an easterly direction—beginning in Scotland and ending in Greenland. Wherever he pauses, he looks backward and forward in time—where the boreal forests have been, whom they sustained, and how they’re changing.

If I were to choose an epigraph for *The Treeline*, it would be a sentence Rawlence writes about the delicate “willow zone habitat” on Creag Fhiaclach in Inverness-shire, Scotland: “I thought I was paying attention, but a whole different level of noticing is required.” That



sentiment accompanies him everywhere. You feel the layering of his heightened noticing throughout the book—his ability to turn over a topographical or biological detail and find on its underside a rune that changes everything. In a sense, he’s emulating the heightened sensitivity of many woodland creatures—reindeer that can see ultraviolet light, wood ants that can taste the differences between tree resins, birds that prefer the resonance of the wood of old-growth trees. And there’s a moral to that sentence—“a whole different level of noticing is required”—that captures the strangeness of the changes happening all around us. As things begin to come apart, we see more clearly the connections that bound them together.

*The*



Karen Radford: *Off-Kilter*, 2021

*Treeline* is particularly alive to the dynamism of climate change. Rawlence describes downy birch in Norway “storming over the top and out into the open, moving upslope at the rate of 130 feet a year.” The British Isles, meanwhile, are sailing south at roughly twelve miles per year of climate velocity. (There are complex scientific definitions of “climate velocity,” but in essence it means how far, at what rate, and in



what direction a region would have to travel to experience its current climate, as compared with a historical norm.) All along the treeline, he writes, “an enormous amount of territory is being transformed from tundra into woodland at a lightning pace.” In case that sounds good—more trees!—Rawlence notes that “the birch improves the soil and warms it further with microbial activity, melting the permafrost and releasing methane,” a greenhouse gas far more dangerous than carbon dioxide. Behind it all lies a volatility formerly invisible at the scale of human life. Rawlence writes, “The landscapes we have grown up in and taken for granted for a few short generations are not timeless at all, but a human-shaped moment in a continuous dynamic.”

That’s the most important difference between *The Treeline* and *Ever Green*. Reid and Lovejoy dwell almost entirely on human actions, their effect upon the megaforests, their consequences for climate change. The reason is obvious: harmful human actions can perhaps be changed by human action. Rawlence, instead, is observing the ways climate change itself is altering the boreal landscape, creating a feedback loop well beyond the immediate control of humans.

He quotes Chekhov, in *Sakhalin Island* (circa 1893): “The taiga is mighty and invincible, and the phrase ‘Man is the ruler of nature’ nowhere sounds so diffident and false as here.” But looked at across time, the Taiga—which is covered by four species of larch, “the greatest arboreal source of oxygen on earth”—may have been transformed by the early hunting practices of “a super-predator called *Homo sapiens*.” According to one theory, “the apparently timeless larch taiga is in fact a geological upstart—a weed unleashed by human activity.” It’s now being transformed by severe wildfires, which are caused by climate change, which is caused by humans, almost none of whom have ever seen the “mighty and invincible” Taiga.

Like the authors of *Ever Green*, Rawlence finds hopefulness—if not actual hope—in what he learns of indigenous knowledge and practices. Indigenous peoples, he notes, “do not imagine humans as separate from the land, but as part of a total system, one organism.” Their ethos requires an entirely different relation to the Earth and the creatures that live upon it, like the Sámi concept of sufficiency:

You only take what is necessary from nature, never a surplus. It is the exact opposite of the modern idea of sustainability, which is based on the maximum surplus that can be extracted without destroying nature’s capacity to sustain the resource.

To leave an abundance beyond your need, *that* is the principle, one that has no footing in modern society. And so Rawlence’s conclusions are not encouraging. He says, simply, “The planet you think you live on no longer exists.”

Ben Rawlence leaves us almost exactly where Alexander von Humboldt found himself in 1800—but feeling just the opposite. The thought of nature without humans was “strange and sad” to Humboldt. To Rawlence, the thought that the “evolutionary journey” will continue without our species has its own beauty: “The way out of the depression and grief and guilt of the carbon cul-de-sac we have driven down is to contemplate the world without us,” to accept that life—in the broad sense—is a continuum, “as the forest teaches us.” This feels, in a sense, like a natural philosophical concession—a recognition that for all its intuitive beauty and richness, the indigenous understanding of nature is a terribly insubstantial counterweight to the brute force of global economic exploitation. It’s an acknowledgment that no matter how we turn our attention outward—doing our best to foster political and economic change—we have to prevent in ourselves an inner deforestation of spirit and mind.

I’ve had thoughts very much like Rawlence’s—finding consolation in the long view of evolution and, in my case, even in thinking about the geodynamics at work below this planet’s biological skin. More and more, though, I think about humans and symbiosis—our “living together” with biological organisms of different species. Symbiosis sounds at first like a metaphorical extension of what Wordsworth and Coleridge were working on in their early poetry—the thought that the mind and the world somehow shape each other. The connection they were exploring was metaphysical and emotional, not biological. And there’s always a problem with metaphors. No matter what they touch, they have a way of turning everything human.

But symbiosis isn’t a metaphor. The symbiotic connection between us and the world around us is biological, literal. Surely, instead of thinking of ourselves as Humboldtian observers, alone and separate in the “ancient inheritance” of the natural world,<sup>5</sup> we need to begin thinking of ourselves in connection to the organisms and systems and networks we are biologically symbiotic with, in whose presence we have coevolved. Climate binds us all together. Life binds us all together. We need to think of ourselves as symbionts—intrinsically linked with all other lives, of every species. That connection—inscribed within us genetically—confers a profound responsibility upon us, a responsibility that looks more and more like simple self-restraint.

The forest outside my office sometimes seems like a forest out of history—an ahistorical forest. It’s old, but it’s not old growth. It’s the living erasure of the native forest that was cut down two centuries ago—itsself a violent erasure of the people who lived here for generations before Europeans arrived. The act of cutting and burning that native northeastern old-growth forest is exactly the thing we’re trying to stop now in the five megaforests described in *Ever Green*. I try never to forget that.



And yet in the forest just out my door there's a biological purity that makes history hard to remember. The forest does what it does in the way forests have always done, symbiotically. And if its diversity is less than the native old-growth forest that preceded it—no chestnuts, no elms, fewer beeches, more birches—it still engages in photosynthesis. It still sequesters and stores carbon to the best of its ability. How it will be transformed, time will tell—and perhaps far less time than I hope. Of the rainforest in 1800, Humboldt wrote, “We seem to be transported into a world different from that which gave us birth.” I could say the same thing about the life we're living now.

## **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. Oliver Morton, *Eating the Sun: How Plants Power the Planet* (Harper, 2008), p. 97. ↵
2. To deny the anthropogenic origin of climate change is, at this point, like denying that forests are being felled by actual humans. ↵
3. See, for example, the Forest Landscape Integrity Index, Global Forest Watch, and the Brazilian Annual Land Use and Land Cover Mapping Project (MapBiomass). ↵
4. I often spoke to Tom about environmental matters when I was a member of the *New York Times* editorial board. He also played a part, for which I'm grateful, in bringing me to Yale University, where I've taught since 2012. ↵
5. For all his discernment, sometimes Humboldt misses the point. He tells the story of a soldier who'd spent his whole life in the Amazon and who asked one night about the stars in the sky. After Humboldt explains what little he can, the soldier says, “I think I see in the stars...a plain covered with grass, and a forest... traversed by a river.” To Humboldt, this is only “the impression produced by the monotonous aspect of those solitary regions.” ↵

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