

Communicating Green

How language and culture shape
our understanding of tree science

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Trail Map

As a student who has set out on a wide academic course of study, ranging from English to psychology, and photography to environmental studies, I have found that educating the public on environmental science requires more than just numbers and data. Though humans like to think we are logical creatures, emotions are at play behind every decision we make, and even seemingly objective facts are always framed by some level of subjectivity.

In the Anthropocene epoch, marked by melting glaciers and species extinction, effective scientific communication is crucial. Statistics, metaphors, indigenous knowledge and techniques such as personification, animate grammar, and botanification¹ aid readers' environmental science comprehension. Used in combination with each other, these methods of communication lead the reader to reflect upon themselves and retain environmental science on a deeper level. Methods of writing about science that engage emotions and ethics can inspire behavioral change.

Cognitive dissonance is an uneasy mental space to inhabit. In psychology, cognitive dissonance occurs when a person has conflicting beliefs or behaviors. To escape this state of mental unrest and restore balance, the person must adjust their beliefs or behaviors.² Humans that already hold environmentally ethical beliefs struggle to match their behavior, to their ideals because the language that bridges the two lacks a respectful land-rhetoric. Environmental values are being lost in translation through a grammar that imprisons living non-human beings in the categories of "things" and "its." Those without core environmental values may be missing a deeper understanding of environmental science. How does artful prose speak to people's moral principles? And how does this resonance help absorb scientific knowledge? *The way* in which a seed of information is planted determines how deeply the knowledge will be absorbed.

New scientific research on forest ecosystems is unveiling human-like parallels in the ways trees age, cope and communicate. These findings are stretching the boundaries of scientific communication through fiction and non-fiction literature. Four contemporary authors have all chosen human comparisons as their means of communicating tree science. In humanizing trees and "tree-izing" humans their ecological teachings become emotional, encouraging the reader to empathize with the trees. These deliberate rhetorical choices aim to redefine the general public's previous ecological perceptions of what it means to be a tree. The science sticks because it evokes sentiment. The sense of awe gained from reading about trees is an attempt to match the experience of being in a forest itself.

My favorite forest trails are loops, where the journey is the destination. The hike is a beautifully mysterious story that comes full circle, ending where you began, but with a wonder-wrapped resolution. However, a forest's story never ends. On a walk through the woods we only read *our* version of *their* story, what our eyes allow us to believe and what our preconceptions allow us to see.

In the pages to follow we will explore beyond what our eyes see, into an eco-literary jungle of relationships between humans and trees. Our path will begin beneath the soil, traveling up and out from the inner-workings of humans and trees, to the functions of human and tree bodies, to the collective functions of cultures and forests, then grounding us again to the interdependencies of humans and Earth. We will explore through the scientific discoveries of four authors: Robin Wall Kimmerer, an Indigenous botanist and professor; Peter Wohlleben, a German forester; Richard Powers, an American novelist; and Florence Williams, an American journalist. We will look at how these authors set out on an artistically scientific mission to tell the forests' stories.

“Standing around us we see all the Trees. The Earth has many families of Trees who each have their own instructions and uses. Some provide shelter and shade, others fruit and beauty and many useful gifts. The Maple is the leader of the trees, to recognize its gift of sugar when the People need it most. Many peoples of the world recognize a Tree as a symbol of peace and strength. With one mind we greet and thank the Tree life. Now our minds are one.”

–Braiding Sweetgrass, Thanksgiving Address





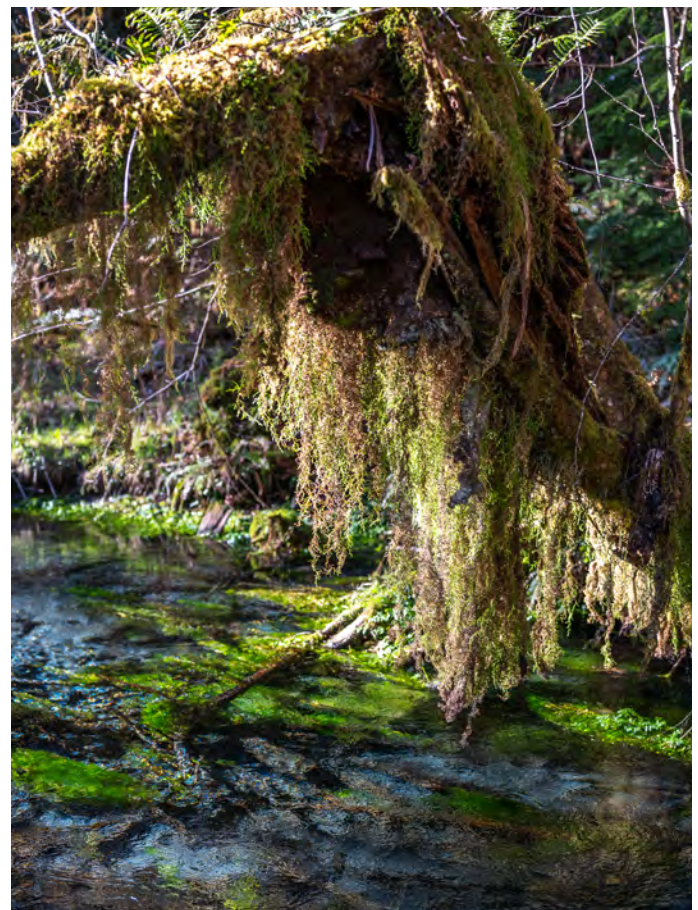
Indigenous Grammar Animates the Life in Life Sciences

Language, which is said to be what differentiates human animals from plants, fungi and non-human animals, is the bridge between societies' beliefs and their behaviors. Each language stems from different cultural ideologies, which are unconsciously expressed in the words we use, the order we put them in, and the meanings we give them. These socially accepted principles trace back to the environments from which the language evolved, rooting each language in the cultures' relationship with the earth.

In 1066 the French-speaking Normans invaded England. The English language adopted French and Spanish derived words.³ In the 1500s Europeans invaded Turtle Island, present day North America. The process of colonization forced many Indigenous cultures to assimilate the English language. While there was some resistance,⁴ more than half of Indigenous languages were lost.⁵ Having grown up in the midwestern United States, the only places I've encountered Indigenous words are in the names of streets, cities and states. A sad homage to the peoples European colonizers called savages. In turn few of their values or beliefs were passed on to the newcomers. Consequently, the land changed, along with language and the values of its people.

Robin Wall Kimmerer is an Indigenous environmental scientist and professor, with a bachelor's degree in Botany and a PhD in Plant Ecology from The University of Wisconsin-Madison. Kimmerer's non-fiction book *Braiding Sweetgrass* weaves Native American traditions and stories with ecological explanations. She sets the framework for her thinking in the chapter "Learning the Grammar of Animacy." "Animacy is a grammatical and semantic feature, existing in some languages, expressing how sentient

or alive the referent of a noun is."⁶ Kimmerer explains that English is made up of roughly 70 percent nouns and 30 percent verbs. The opposite is true for the Indigenous language, Potawatomi. Potawatomi gives movement to natural elements or living beings that the English language would consider nouns. For instance, the English noun, "bay," is the Potawatomi verb *wiikwegamaa*, "to be a bay." What would in English be an object is in Potawatomi an animate life-form. "A bay is a noun only if water is *dead*. When a bay is a noun it is defined by humans, trapped between its shores and contained by the word. But the verb *wiikwegamaa* –to be a bay–releases the water from bondage and lets it live."



In Potawatomi, non-human life isn't just any life, it is familial life. Kimmerer writes, "In English, we never refer to a member of our family, or indeed to any person, as *it*. That would be a profound act of disrespect. *It* robs a person of selfhood and kinship, reducing a person to a mere thing. So it is that in Potawatomi and most other indigenous languages, we use the same words to address the living world as we use for our family. Because they are our family."

The English language objectifies natural elements and other living beings as things. This suggests that an English speaker can treat a tree with the same amount of respect they do a table, hammer or toilet, though no one would ever swing an axe through a perfectly functioning toilet. Kimmerer writes, "Saying it makes a living land into 'natural resources.' If a maple is an *it*, we can take up the chainsaw. If a maple is a *her*, we think twice."

Though not a living organism, language acts as humanities' invisible root system, connecting our internal thoughts to each other and to our external world. It allows us to share our ideas and make them tangible. But as a species with far more agency, the messages we send through our words can have detrimental effects. Our inanimate impressions of other living organisms have left and will continue to leave physical impressions on the face of our earth.

Indigenous knowledge and scientific knowledge are both nurtured by observation and experiment; the former is expressed through the grammar of animacy and the latter is explained with specific processes and Latin names. In Kimmerer's woodland classroom she blends indigenous and scientific wisdom in her teachings. "I try to be mindful of my language, to be bilingual between the lexicon of science and the grammar of animacy," she writes. One day, after a lesson in animate language a student asked her, "Doesn't this mean that speaking English, thinking in English, somehow gives us permission to disrespect nature?" This epiphany could be more a remembrance of simpler times. Children, while still learning the rules of English grammar, often refer to plants and animals the same way they refer to people. Unfortunately, our language leads us to correct a child who might ask, "*who* is that?" In reference to a tree, English speakers must say "*what* is that."

Science depends on words to give meaning to its numbers. People depend on ethics to give meaning to their actions. Artful scientific prose, which acknowledges animacy, can reconnect a wider audience to the wonders of the natural world, yielding a deeper level of scientific comprehension and earthly appreciation.





“The canopy is a multilayered sculpture of vertical complexity from the lowest moss on the forest floor to the wisps of lichen hanging high in the treetops, raggedy and uneven from the gaps produced by centuries of windthrow, disease, and storms. This seeming chaos belies the tight web of interconnections between them all, stitched with filaments of fungi, silk of spiders, and silver threads of water.. *Alone* is a word without meaning in this forest.”

—Braiding Sweetgrass

Talking Trees

Now that we have explored human language and the cultural values our grammar implies, we will examine how metaphor, simile and analogy awaken our senses to the ways *trees* talk. Yes, I will be “talking” about how humans “talk” about how trees “talk.” How does figurative speech compliment the literality of science? How do these literary devices connect the reader to the science behind the words on the page and to the animacy within the trees in a forest?

Peter Wohlleben graduated from Rottenburg University of Applied Forest Sciences and worked in forestry for over 20 years. “We have learned that mother trees recognize and talk with their kin, shaping future generations. In addition, injured trees pass their legacies on to their neighbors, affecting gene regulation, defense chemistry, and resilience in the forest community,” writes Wohlleben.

Communication is key to growth, both for the exchange of nutrients in a forest ecosystem and for the fermentation of knowledge in society. Products of human communication can be experienced in the forms of cities, technology and art. Products of tree communication can be seen, smelt, and faintly heard in the forms of forests, stumps and roots. From the dinner table to the world wide web, humans express how we feel and what we’ve learned, in exchange for the feelings and knowledge of others. From their leaves to the “*wood* wide web,” trees share nutrients and information, in exchange for the nutrients and information of others. When people need a break from all the human commotion, many find themselves wandering through a forest, where arboreal commotion is quiet, slow and fragrant.

So how exactly do trees “talk”? Trees communicate through “olfactory, visual, and electrical signals,” explains Wohlleben. In the African savannah, acacia trees release toxic chemicals out of their leaves upon sensing a giraffe’s nibble. These chemicals also act

as warning signals for nearby trees, who also begin pumping these toxins through their leaves. But in forests, trees also rely on electrical signals through their root tips, connected underground by fungal synapses. “These fungi operate like fiber-optic internet cables,” Wohlleben explains, with a human-technology simile. “The fungal connections transmit signals from one tree to the next, helping the trees exchange news about insects, drought, and other dangers.” Science has come to call this the “wood wide web.”

Wohlleben explains that research from the University of Western Australia has even detected sounds coming from roots. “Their measuring apparatus was registering roots cracking quietly at a frequency of 220 hertz,” writes Wohlleben. “Plants communicating by means of sound waves? That makes me curious to know more,” inserts Wohlleben, “because people also communicate using sound waves.”



Tree Bodies

We've traveled from the intangible human and arboreal forms of communication and will now look at the bodies that sustain these functions.

"People see better what looks like them," writes fiction author Richard Powers. Wohlleben seems to agree. In his chapter "Trees Aging Gracefully," Wohlleben uses analogy to teach the reader about the bodies of trees and the changes they experience as they grow through life.

"Before I talk about age, I would like to take a detour into the subject of skin. Trees and skin? First let's approach the subject of skin from the human point of view. Our skin is a barrier that protects our innermost parts from the outer world. It holds in fluids. It stops our insides from falling out, and all the while it releases and absorbs gas and moisture. In addition, it blocks pathogens that would just love to spread through our circulatory system. Aside from that, it is sensitive to contact, which is either pleasant and gives rise to the desire for more, or painful and elicits a defensive response."



First, Wohlleben makes a point to his readers that he is shifting to a human perspective, implying that up until that point they've been engulfed in a more scientifically mechanical description of tree functions. Words like "sensitive," "pleasant," "desire," "painful"—plant a seed in the reader's mind that trees, too, *feel*. Wohlleben waters this seed to ensure its growth, by asking and answering his own rhetorical question: "And how does this relate to trees? It's just the same with them. The biggest difference is simply the vocabulary we use. The skin of Beeches, Oaks and Spruce is called bark." Here, Wohlleben directly refers to trees' bark as skin. He also capitalizes the tree species names like one would capitalize a person's nationality—German, African, Indian.

Where I take issue is in the sentence: "It's just the same with them." This seems like a brash overgeneralization. Bark and skin *do* function in very mirrored ways, but bark's differences should be appreciated in a way that isn't only reflected in humans. Though a common reader may find ease in this child-like simplification, a reader with a scientific background may be turned off and irritated by it. Every analogy can only go so far, and a lack of justification can lead to a lower scientific competency.

In the pages to follow Wohlleben walks the reader through the physical changes trees undergo as they age, oh so slowly. For, "at about 100, they have just outgrown their youth." He uncovers human-parallels in how trees' "skin" darkens and hardens in the sun, and is more likely to crack; how "wrinkles gradually appear...and they steadily deepen as the years progress...the deeper the cracks, the more reluctant the tree is to shed its bark." How tree skin can get "skin diseases" and carry lifelong scars or have festering wounds. "So it is not only in people that the skin is a mirror to the soul (or state of well-being)," he writes. This metaphor concludes his scientific



explanations of tree skin and sends the reader off with the potential for them to judge a tree's book by their cover. But further, this analogy gives trees a *spiritual* animacy—green beings with a soul, that humans can empathize with through their bark.

Wohlleben continues on how the highest branches in trees' crowns thin with age, just like humans' hair. This also means the tree begins "shrinking". As the trees vascular system and roots grow exhausted eventually, pumping water up to the top of the tree. Trees begin to grow wider *and* shorter with age. "(another parallel to many people of advancing years)" Wohlleben nudges, between parenthesis.

Finally, at the end of the tree's life, Wohlleben describes the gradual and beautiful death of a tree, a stage of life less comparable to humans. Year by year fungi penetrate through wounds in the old skin, where they begin decomposing the body, "deep into the wood at the heart of the tree." The tree fights until the very last moment. When the elder falls, its trunk is ready to "serve as a cradle for its own young."

Wohlleben shifts from this maternal metaphor to give a hardy German explanation. "Young spruce sprout particularly well in the dead bodies of their parents. This is known as 'nurse-log reproduction' in English, and, somewhat gruesomely, as *Kadaververjungung* or 'cadaver rejuvenation,' in German," writes Wohlleben. Here we can identify the different cultural values embedded in the languages. Each of these culturally coded terms describe an ecological process through a human lens. This is where Kimmerer's animacy differs from Wohlleben's personification. While the Potawatomi language gives

non-human living beings sentient acknowledgement, personification assumes a culturally anthropocentric (human-centered) value, overlooking the traits that are very *un*-human. While this tactic speaks well to the consumptive culture of today, it doesn't encourage the biocentric values needed for a sustainable future. Personification is the environmental elementary step toward animacy, toward a society that respects other living beings for what they are, not for resembling a human. Animacy allows the tree to be a tree.

The Hidden Life of Trees' personified presentation of scientific findings became a *New York Times* bestseller and has been translated from German to 15 other languages, selling 320,000 copies in its first six months. The book's teachings have been referenced in the national bestseller, climate-fiction novel, *The Overstory* by Richard Powers, and in *National Geographic* articles, including journalist Michelle Z. Donahue's "Ancient Forest Home of Squatter Communities Is Doomed by Coal." From fiction to nonfiction, literary to journalistic, Wohlleben's message has spread through humans' own communicating networks. The book's popularity suggests his personification of trees as "kin," "neighbors" and "forest communities," is a useful tactic, even though the anthropocentric analogies also go too far at times.

"There is not enough science in Peter Wohlleben's *The Hidden Life of Trees* to satisfy one's curiosity, or if there is, it's hidden under layers of fluff and sappy anthropomorphism," writes Anita Roy from *The Hindu Business Line*. When personification is relied on too heavily in non-fiction the science loses its merit. After all, a tree is not a human.



“But we shouldn’t be concerned about trees purely for material reasons, we should also care about them because of the little puzzles and wonders they present us with.”

–*The Hidden Life of Trees*



Science in Fiction

Richard Powers began studying Physics at the University of Illinois at Urbana-Champaign, but switched from science to humanities, graduating with an English Literature degree.⁷ *The Overstory* is a scientifically driven work of art; even the title has both an ecological and metaphorical meaning. An “overstory” is both the highest level of canopy that shades younger trees, and an allusion to the overarching plot development of this multi-story text. Although a novel about fictional events, *The Overstory* incorporates lessons from *The Hidden Life of Trees* into its narrative. One of the nine main characters, Patricia Westerford, resembles forest ecologist, Suzanne Simard, who Wohlleben cites throughout *The Hidden Life of Trees*.

Towards the end of Powers’ novel, his use of botanification becomes clear. He describes Mimi, one of the main characters, as she sits at the base of a tree, reflecting and being still: “A woman sits on the ground, leaning against a pine. Its bark presses hard against her back, as hard as life. Its needles scent the air and a force hums in the heart of the wood. Her ears tune down to the lowest frequencies. The tree is saying things, in words before words.”



Fiction has the license to do what non-fiction cannot: stretch the boundaries of humans’ sense of sound for one, but also give trees a voice. In *The Overstory* the trees’ electric signals and low frequency hummings send messages to the human characters of the story. But instead of bringing the trees to a human level, Powers brings humans to a tree level. “A thing can travel everywhere, just by holding still,” the pine’s signals say to Mimi. “She sees and hears this by direct gathering, through her limbs,” writes Powers. For a moment, Mimi has become the tree, communicating through her own limbs to send and receive messages from the air, the bark and the “soil-gripping roots” of the pine.

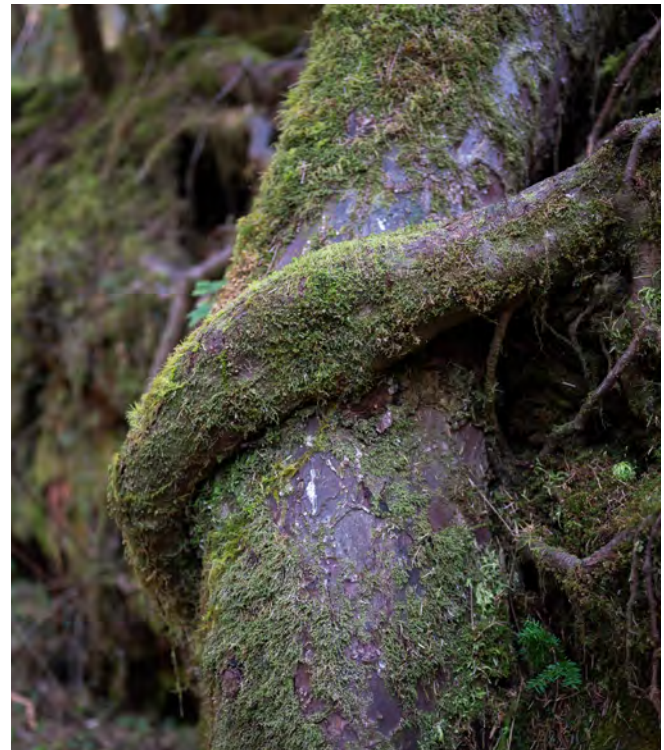
“People see better what looks like them,” writes Powers. This is exactly why personification is used. So why then does Powers flip it, botanifying humans? Perhaps this is to reorder the human hierarchy of earthly beings to a more biocentric mindset.

A Mutual Reliance

Just as fiction can integrate highly accurate arboreal science, popular texts that are more scientifically oriented still situate the data within a history of how science and the arts have evolved from the personal passions of scientists.

Florence Williams graduated with a PhD in Organic Chemistry from the University of California, Irvine. She is now a public speaker, journalist, and freelance writer for publications such as *National Geographic* and *The New York Times*. Williams' more "matter-of-fact" writing differentiates *The Nature Fix* from Wohlleben's *The Hidden Life of Trees*. In *The Nature Fix* Williams persuades her audience on "Why nature makes us happier, healthier and more creative." Though words like "happier" and "more creative" seem ambiguous and subjective, she utilizes the knowledge of credible nature neuroscience researchers, traveling with and quoting them throughout her book. "The aspiration of this book: to find the best science behind our nature-primed neurons and to share it," she writes. Williams' journalistic style of documentation blends with her first-person thoughts and experiences. Jason Mark from *The New York Times* writes, "She's got the pop-sci presentation down pat— breezy enough to draw in the lay reader, thorough enough to satisfy the expert."⁸

Aristotle, Charles Darwin, Albert Einstein, Teddy Roosevelt, John Muir, Beethoven—they all gathered inspiration from the natural world. Williams quotes Beethoven in the book's introduction: "The woods, the trees and the rocks give man the resonance he needs." She prefaces that, "This book explores the science behind what poets and philosophers have known for eons: place matters...these men were speaking of a melding of inner and outer systems...they were arguing the explorations of twenty-first-century neuroscience...our nervous systems are built to resonate with set points derived from the natural world."



Williams sets up the book with a string of relationships between the sciences and the arts, a way in which they work together to define each other. Her research revolves around proving with science how nature positively impacts seemingly immeasurable human feelings—happiness, creativity, well-being, awe. Williams writes with an intuitive *knowing* backed by scientific proof, which matches the subject of her study—she sets out to explain the neurological science behind the innate human draw to nature for peace.

Williams' research found that trees in forests, especially Evergreens, pump phytoncides into the air. Phytoncides are aerosols that smell good and decrease cortisol (stress hormone) levels in humans. She relates that these tree scents have also been shown to increase the level of natural killer immune (NK) cells in the human body. NK cells are a type of white blood cell, that "send self-destruct messages to tumors and virus-infected cells." Her description of human bodies' inner-processes reads similar to the way Wohlleben's inner-processes of tree bodies reads. Where Powers *shows* trees communicating in "words before words," these non-fiction texts both suggest wordless *messages* are being *sent* from inside the bodies of trees and humans, via chemicals and cells. These tree chemicals and human cells are defending their bodies from a perceived danger. It is then an interesting connection that when both bodies come together, human and tree, the human cells benefit from the trees' scent signals.

Williams keeps her readers engaged, rotating between the scientific proofs and the philosophical or spiritual beliefs that draw people to nature. This holistic approach draws emotion and cognition together—the science and the arts, the measurable and the awe of the immeasurable.

"For millennia, humans alone or in small groups have at times sought out a sparer, more elemental connection to the forces of nature. They come because they are needing something, and they keep coming because they are finding it. Their pursuits may be spiritual, interpersonal or emotional, deeply human and complex and unlikely to be explained in a bar graph."

This way of thinking reiterates the indigenous ecological teachings in *Braiding Sweetgrass*. In each chapter Williams introduces the reader to a new culture that has prioritized the study and practice of nature healing. She acknowledges the cultures' historical beliefs and relates them to their current environmental values. "Once upon a time in Finland, there were little forest spirits who could put spells on people who were too noisy or who treated the forest with disrespect," she begins her chapter on Finland's forest findings. This introduction sheds light on the Finnish peoples' historical relationship with the land, which motivates their research on forests' effects on human health. Williams' movement between hard science and anecdotal stories keeps the reader engaged on an emotional and logical level.



Old Growth Cultures and New Arboreal Discoveries

“If we are looking for models of self-sustaining communities, we need look no further than an old-growth forest. Or the old-growth cultures they raised in symbiosis with them.” Kimmerer’s *Braiding Sweetgrass* chapter “Old-Growth Children,” set in the coastal rainforests of the Pacific Northwest, depicts Kimmerer’s gift for paralleling ecosystem cultures to human cultures.

She walks the reader through the ways Indigenous people of the Pacific Northwest utilized and shared the resources of the land, explaining how both people and planet profited, not with money but generosity.

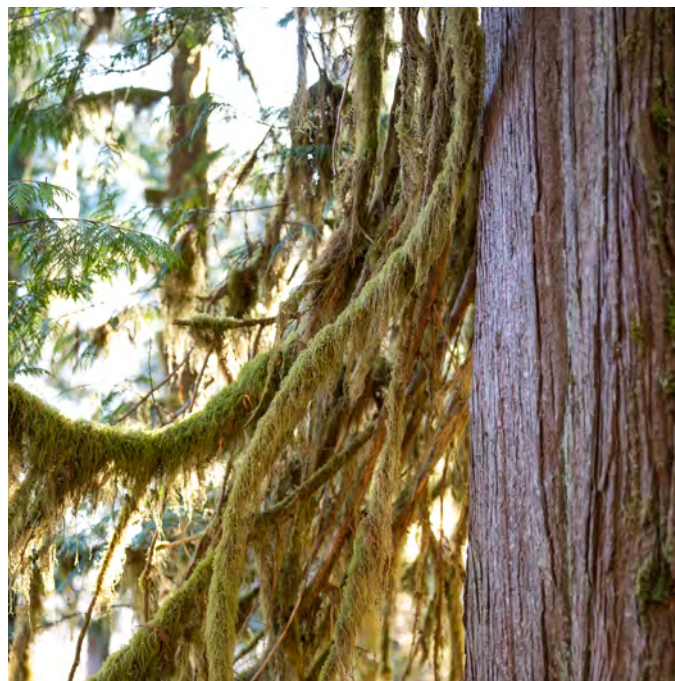
“This is the land of the tree of ample hips and full baskets, the one known in the Salish languages as Maker of Rich Women, as Mother Cedar. No matter what the people needed, the cedar was ready to give, from cradle board to coffin, holding the people.” Indigenous peoples of this time didn’t read the internet or science textbooks to understand the forests’ delicate balance. They read the forest. Through their own observations they knew which trees best served which human purpose, and which human actions best served the trees.

Gathering their resources was a ritualistic endeavor. The women sang while walking down their familiar trails to respectfully ask for what they needed and give thanks, prayers and offerings to the earth for what they took. Harvesting a respectful amount of bark from trees was sometimes all they needed. Their incentive was directly related to maintaining the rich ecosystem that supported them. “Wealth meant having enough to give away, social status elevated by generosity. The cedars taught how to share wealth, and the people learned.” This mindset, conveyed through their language, was expressed in their actions, resulting in their harmonious relationship with their intertwined ecosystem. “Today, when the cedar is mistaken for a commodity from the


lumberyard, the idea of gift is almost lost. What can we who recognize the debt possibly give back?” Kimmerer asks.

Environmental activist and writer Aldo Leopold held mutual beliefs about the Wisconsin prairie marshland he lived on. Leopold writes, “We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect.”⁹ Leopold was of European descent, and while he and Kimmerer come from different cultural starting points they arrived at the same key teaching—humans’ emotional relationships with land matters.

Kimmerer gives agency to trees as teachers, reminding the reader that every culture stems from the earth. “We may not have wings or leaves, but we humans do have words. Language is our gift and our responsibility.” As the trees helped to give humans language, we must use our language to give back to them.







“Clicks and chatter disturb the cathedral hush. The air is so twilight-green she feels like she’s underwater. It rains particles—spore clouds, broken webs and mammal dander, skeletonized mites, bits of insect frass and bird feather. . . . Everything climbs over everything else, fighting for scraps of light. If she holds still too long, vines will overrun her.”

—*The Overstory*

Words Planted by Trees

“The Finnish word for healthy, *terve*, derives from the word for ‘hardy pine,’ able to withstand storms.” *–The Nature Fix*

“...the word beech becomes the word book, in language after language...book branched up out of beech roots, way back in the parent tongue...beech played host to the earliest Sanskrit letters.”
–The Overstory

In following our words back to the forest, we are reminded that our word for book comes from the beech trees themselves, who photosynthesized a physical medium for some of humans’ first written thoughts. The Finnish are reminded that just as “healthy” transpired from the self-sustaining Pine, people’s own hardy existence is not separate from that of the Pines.

As we continue to understand trees’ humanlike functions and human health benefits, we can begin to respect them on a more personal level. Hopefully, one day this will lead us back to appreciating forests for their very un-human qualities: how they give to species unlike their own, to sustain their environment as a whole; how they absorb the carbon dioxide we give off; how they live a slow paced life, yet accomplish so much when allowed to grow old; how animate they are, even in their stillness.



A Grateful Circle

In *The Overstory*, Powers describes Patricia Westerford's passion for trees, as she testifies in court on the importance of protecting old-growth forests. Westerford's character is a scientist driven by deep-rooted arboreal adoration. "Love for trees pours out of her—the grace of them, their supple experimentation, the constant variety and surprise. These slow, deliberate creatures with their elaborate vocabularies, each distinctive, shaping each other, breeding birds, sinking carbon, purifying water, filtering poisons from the ground, stabilizing the micro-climate. Join enough living things together, through the air and underground, and you wind up with something that has intentions."

Westerford's scientific understandings of forests meld with the aesthetic and spiritual feelings of wonder they give her. Within this space, where facts and feelings agree with one another, gratitude flourishes.

This is the secret behind Indigenous wisdom. Kimmerer writes of the Thanksgiving Address that Indigenous cultures view as their Pledge of Allegiance. "The Thanksgiving Address is at heart an invocation of gratitude, but it is also a material, scientific inventory of the natural world...each element of the ecosystem is named in its turn, along with its function. It is a lesson in Native science... Recognizing abundance rather than scarcity undermines an economy that thrives by creating unmet desires. Gratitude cultivates an ethic of fullness." This is the mindset that carries "good manners" over to the natural world. Where we say "please" and "thank you" to the trees because we scientifically understand how they endure and emotionally feel for them. Gratitude exists when logic lets love in.

Powers writes of Westerford's direct tree-preciation, "She addresses the cedar, using words of the forest's first humans. 'Long Life Maker. I'm here. Down here.'

She feels foolish, at first. But each word is a little easier than the next.

'Thank you for the baskets and the boxes. Thank you for the capes and hats and skirts. Thank you for the cradles. The beds. The diapers. Canoes. Paddles, harpoons, and nets. Poles, logs posts. The rot-proof shakes and shingles. The kindling that will always light...' Each new item is release and relief."

In the decades to come Powers may be revered as a climate-fiction novelist before his time, but let us not forget the Indigenous wisdom that shaped a language and culture that has always been living symbiotically amongst the trees, "trees that were born before Columbus sailed," Kimmerer reminds us.



References

Primary Books Analyzed in Communicating Green

- Kimmerer, Robbin Wall. *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teachings of Plants*. Milkweed Editions, 2013.
- Powers, Richard. *The Overstory*. W.W. Norton & Company, 2018.
- Williams, Florence. *The Nature Fix: Why Nature Makes Us Happier, Healthier, and More Creative*. W.W. Norton & Company, 2017.
- Wohlleben, Peter. *Hidden Life Of Trees: What They Feel, How They Communicate: Discoveries from a Secret World*. Greystone Books, 2016.

Other Research Reading that Inspired Communicating Green

- Adams, John Joseph, editors. *Loosed Upon the World: The Saga Anthology of Climate Fiction*. Simon & Schuster, 2015.
- Carson, Rachel. *Silent Spring*. Houghton Mifflin, 1962.
- Kimmerer, Robbin Wall. *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teachings of Plants*. Milkweed Editions, 2013.
- Kolbert, Elizabeth. *The Sixth Extinction: An Unnatural History*. Henry Holt and Company, 2014.
- Leopold, Aldo. *A Sand County Almanac: And Sketches Here and There*. 1949. Oxford Press, 1953.
- Macfarlane, Robert. *A Sand County Almanac: And Sketches Here and There*. Hamish Hamilton, 2012.
- Muir, John. *The Mountains of California*. 1894. Fulcrum, 1988.
- Schimmel, Schim. *Dear children of the Earth: A Letter from Home*. Creative Publishing International, 1994.

Notes

¹Botanification is a word I created to define a literary device that gives plant-like characteristics to humans or other animals. This word is a cousin to personification and zooification. Where personification imposes human-like characteristics to non-human beings, zooification gives non-human animal-like characteristics to people. See Abrams, M. H. *A Glossary of Literary Terms*. Wadsworth Cengage Learning, 2015. I created botanification because some of the texts I work with feature this rhetorical device and no word yet exists for this plant-based literary strategy.

²Mcleod, Saul. "Cognitive Dissonance." *SimplyPsychology*. Updated Feb. 5, 2018. www.simplypsychology.org/cognitive-dissonance.html

³Bowern, Claire. "Where did English Come From?" *Ted-Ed: Lessons Worth Sharing*, July 2015. https://www.ted.com/talks/claire_bowern_n_where_did_english_come_from?language=en. See also, Terry Crowley, Claire Bowern. *An Introduction to Historical Linguistics*. Oxford UP, 2010.

⁴Harvey, Sean P. and Sarah Rivett. "Colonial-Indigenous Language Encounters in North America and the Intellectual History of the Atlantic World." *Early American Studies: An Interdisciplinary Journal*, vol. 15 no. 3, 2017, p. 442-473. DOI: 10.1353/eam.2017.0017.

⁵Barbara J. Boseker. "The disappearance of American Indian languages". *Journal of Multilingual and Multicultural Development* vol. 15, no. 2-3, 1994, pp. 147-160, DOI: 10.1080/01434632.1994.9994562.

⁶Szewczyk, Jakub M., and Herbert Schriefers. "Is animacy special? ERP correlates of semantic violations and animacy violations in sentence processing." *Brain Research*. Vol. 1368: 208-221. <https://doi.org/10.1016/j.brainres.2010.10.070>

⁷Dewey, Joseph. "Biography: Excerpted from *Understanding Richard Powers* by Joseph Dewey." *Richard Powers*. www.richardpowers.net/biography/

⁸Mark, Jason. "Get Out of Here: Scientists Examine the Benefits of Forests, Birdsong and Running Water." *The New York Times*. www.nytimes.com/2017/03/02/books/review/nature-fix-florence-williams.html

⁹Leopold, Aldo. *A Sand County Almanac and Sketches Here and There*. (1949). Ballantine Books, 7th ed., 1986, pp. xviii-xix.



Carly Rundle-Borchert

I created the photographs for this publication in the Hoh Rainforest of Olympic National Park in Washington state. I traveled there in search of the old-growth forests described in *The Hidden Life of Trees*, *Braiding Sweetgrass* and *The Overstory*. Each of these books give credit to the rich mossy green-ness of the forests that lie between the ocean and mountains of the Pacific Northwest. Trees roots embrace in a public display of interdependency. A human arm intertwines with a tree root to show the mutual need one has for the other.

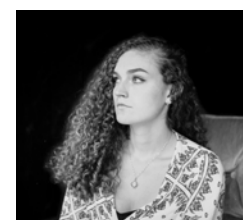
Wohlleben described a specific phenomena that motivated me to photograph the Hoh Rainforest: nurse-log (pictured bottom left). This is where the trunk of a fallen tree provides nutrients for new seedlings. The new trees grow directly out of the tree, connected through their roots and their elder. "Rain then washes this natural fertilizer down the trunks, making it available to the roots. Thus, old trees fertilize the forest and help their offspring get a better start in life," writes Wohlleben. Eventually the deceased tree decomposes, becoming the soil. As the new trees grow-up and the old trunk breaks-down, the young trees' roots become exposed above the ground. Beyond the nurse-log, my photographs aim to shed light on the scientific discoveries of forests and show trees' animacy—trees that care, feel and grow together.

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Hoh Rainforest nurse-log

Julia Mielke



Graphic Designer

