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Book Review: A New Light on Trees

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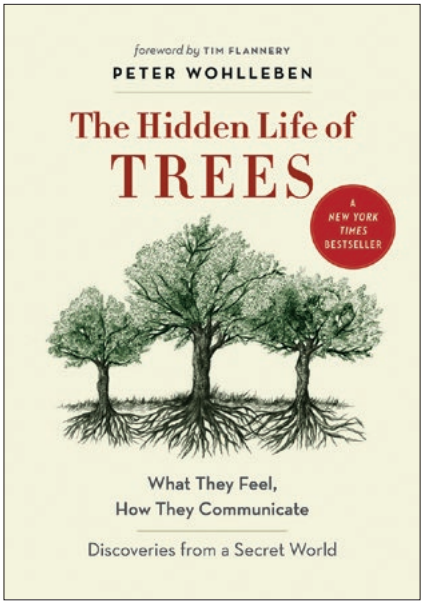
Peter Wohlleben, *The Hidden Life of Trees: What They Feel, How They Communicate* (Vancouver, BC: Greystone Books, 2016).

Each morning as I wash dishes, my eyes seek out the giant fallen tree in the conservation land just beyond the stone wall in my backyard. I often wonder what brought it down and just how long it has been resting, rotting, and returning to the earth. Chances are it will still be there long after I leave this house. Part of the mystery (and majesty) of trees is the slow pace at which they live and die. In *The Hidden Life of Trees: What They Feel, How They Communicate*, Peter Wohlleben reveals the inner workings of trees, shedding light on how a slow pace is a strategy for a long life. Wohlleben is a "reformed" forester, who previously worked for the German government and now manages a natural, sustainable forest for Hümmel, a village tucked away in the Eifel Mountains. His book is a compilation of the knowledge he gained during his time working in the forest and is written as if he is chatting informally during a hike through his beloved woods. Each of the short chapters reveals one of the hidden secrets of trees. The book is a leisurely read, meant to be consumed near a gently crackling fire or slowly swinging in a hammock, enjoying the comforts that trees provide.

The first chapter, "Friendships," reveals perhaps the most stunning of the secrets: trees (and plants in general) are connected to each other underground by symbiotic mycorrhizal fungi and through this fungi they share nutrients and communicate with each other. Wohlleben describes in vivid detail one hike he took through his forest and his discovery of strange, moss-covered "stones." Curious, he removed some of the moss to reveal bark, and underneath the bark, chlorophyll, the hallmark of living plant tissue. His "stones" were the remnants of an ancient beech that was on "life support" from the trees with which it shared underground connections. The roots and fungi form an underground social network, termed the "wood wide web." It wasn't until 1997 when Suzanne Simard and her colleagues published in *Nature* their literally groundbreaking study of the function of ectomycorrhizal connections between Douglas firs and paper birches in Pacific forests that biologists started to appreciate how this hidden network contributes to the overall health of the forest ecosystem. Simard writes a compelling note at the end of Wohlleben's book, putting her scientific stamp of approval on his observations.



The second chapter, "The Language of Trees," details how trees communicate with each other through the use of airborne compounds akin to the pheromones of animals, and also below ground through their fungal connections. Tree-to-tree communication is vital to mounting a defense against herbivory; a tree being chewed on signals to its neighbors to start producing their chemical defenses. Plants are remarkable chemists and each species has a chemical arsenal designed to deter or kill a variety of pests. It is from this arsenal that humans have developed a multitude of medicines. Trees send signals to other trees, and to the members of the animal kingdom as well. Certain animals have developed the ability to detect plants' chemical distress calls, which allows the animals to locate

their next meal or an incubator for their eggs. It goes like this: a caterpillar munches away on a leaf; the plant, sensing both the saliva of the caterpillar and the damaging wounds, releases a specific gaseous compound into the air. Parasitoid wasps, seeking a caterpillar host to lay their eggs in, perceive the compound and follow its concentration gradient to locate the caterpillar. The caterpillar is doomed: when the wasp eggs develop into larvae, they eat their way out of their caterpillar host. It is a gruesome end for the caterpillar, but the plant and wasp each survive to pass on their coevolved communication capabilities to the next generation.

The next chapter, "Social Security," weaves the discoveries of the first two chapters together, arguing that since trees are connected and communicate, their individual fates are bound together in the forest. Through an exceptionally poignant story of a failed girdling attempt he undertook as a young forester, Wohlleben characterizes a forest tree community as a force and sets the stage for the remainder of the book. The succeeding chapters discuss interesting aspects of tree physiology, ecology, evolution and environmental biology. He takes information typically "hidden" from the general public in textbooks and scientific articles and brings it to life with a casual, folksy style. In the final chapters, he makes a compelling argument for sustainable forestry and forest conservation.

The book was originally written in German and at times it suffers from translation issues. Some of these are biologically significant. The "blossoms" he refers to as being "dusted with the foreign pollen of the other spruce" (22) are actually cones (spruce trees are conifers and not flowering plants). Also, "flowering liverworts" (163) are actually members of the genus *Hepatica* (even though liverwort is most commonly associated with the phylum *Hepatophyta*, a group of amazing but non-flowering plants).

Trees operate very differently from humans and Wohlleben's attempts to make them more relatable sometimes go awry. His overzealous use of anthropomorphism is at times annoying (as when he titles his chapter on reproduction "Love"); at others it actually detracts from the power of his message. I take particular issue with his references to trees feeling pain. Yes, plants "feel"; all organisms have the ability to perceive their environments. The ability to sense pressure is found in all life forms, including bacteria (Haswell et al., "Mechanosensitive channels," *Structure* [2011]). So when a storm knocks its branch down or a woodpecker drills through its bark, a tree can sense the change in pressure. But pressure is not the same as pain. As anyone who has undergone dental work knows, anesthetic blocks the perception of pain but she can still feel the pressure of the dentist's tools. Pain is reserved for organisms with neurons.

This book is definitely worth reading. As Wohlleben notes, "Large plants do not have brains, they move very slowly, their interests are completely different from ours, and they live their daily lives at an incredibly slow pace. It's no wonder that even though every schoolchild knows trees are living beings, they also know they are classified as objects" (242). Each story told in these pages reinforces the knowledge that trees are living beings and reduces the tendency to objectify them. Which is why I plan to lend my copy to a chainsaw-happy colleague.

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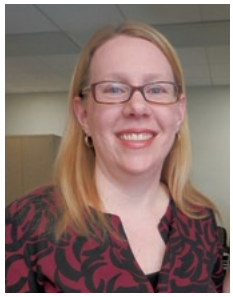

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