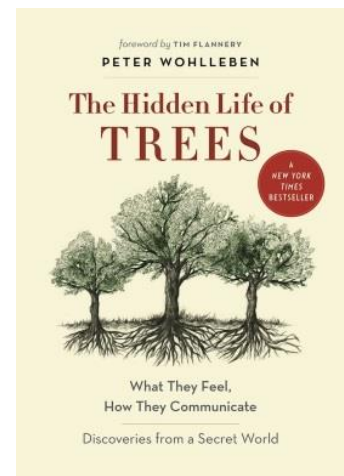


Are Trees Talking to Each Other?

An excerpt of, "*The Hidden Life of Trees: What They Feel, How They Communicate — Discoveries From A Secret World*" By Peter Wohlleben



Chapter 3: Social Security

Are my trees growing too close together?

Gardeners often ask me if their trees are growing too close together. Won't they deprive each other of light and water?

This concern comes from the forestry industry. In commercial forests, trees are supposed to grow thick trunks and be harvest-ready as quickly as possible. And to do that, they need a lot of space and large, symmetrical, rounded crowns. In regular five-year cycles, any supposed competition is cut down so that the remaining trees are free to grow. Because these trees will never grow old—they are destined for the saw mill when they are only about a hundred—the negative effects of this management practice are barely noticeable. What negative effects? Doesn't it sound logical that a tree will grow better if bothersome competitors are removed so that there's plenty of sunlight available for its crown and plenty of water for its roots? And for trees belonging to different species that is indeed the case. They really do struggle with each other for local resources.

But it's different for trees of the same species. I've already mentioned that beeches are capable of friendship and go so far as to feed each other. It is obviously not in a forest's best interest to lose its weaker members. If that were to happen, it would leave gaps that would disrupt the forest's sensitive microclimate with its dim light and high humidity. If it weren't for the gap issue, every tree could develop freely and lead its own life. I say "could" because beeches, at least, seem to set a great deal of store by sharing resources. Students at the Institute for Environmental Research at RWTH Aachen discovered something amazing about photosynthesis in undisturbed beech forests.



Apparently, the trees synchronize their performance so that they are all equally successful. And that is not what one would expect. Each beech tree grows in a unique location, and conditions can vary greatly in just a few yards. The soil can be stony or loose. It can retain a great deal of water or almost no water. It can be full of nutrients or extremely barren. Accordingly, each tree experiences different growing conditions; therefore, each tree grows more quickly or more slowly and produces more or less sugar or wood, and thus you would expect every tree to be photosynthesizing at a different rate.

And that's what makes the research results so astounding. The rate of photosynthesis is the same for all the trees. The trees, it seems, are equalizing differences between the strong and the weak. Whether they are thick or thin, all members of the same species are using light to produce the same amount of sugar per leaf. This equalization is taking place underground through the roots. There's obviously a lively exchange going on down there. Whoever has an abundance of sugar hands some over; whoever is running short gets help.

Once again, fungi are involved. Their enormous networks act as gigantic redistribution mechanisms. It's a bit like the way social security systems operate to ensure individual members of society don't fall too far behind. In such a system, it is not possible for the trees to grow too close to each other. Quite the opposite. Huddling together is desirable and the trunks are often spaced no more than 3 feet apart. Because of this, the crowns remain small and cramped, and even many foresters believe this is not good for the trees. Therefore, the trees are spaced out through felling, meaning that supposedly excess trees are removed. However, colleagues from Lübeck in northern Germany have discovered that a beech forest is more productive when the trees are packed together. A clear annual increase in biomass, above all wood, is proof of the health of the forest throng. When trees grow together, nutrients and water can be optimally divided among them all so that each tree can grow into the best tree it can be.

If you "help" individual trees by getting rid of their supposed competition, the remaining trees are bereft. They send messages out to their neighbors in vain, because nothing remains but stumps. Every tree now muddles along on its own, giving rise to great differences in productivity. Some individuals photosynthesize like mad until sugar positively bubbles along their trunk. As a result, they are fit and grow better, but they aren't particularly long-lived. This is because a tree can be only as strong as the forest that surrounds it. And there are now a lot of losers in the forest. Weaker members, who would once have been supported by the stronger ones, suddenly fall behind. Whether the reason for their decline is their location and lack of nutrients, a passing malaise, or genetic makeup, they now fall prey to insects and fungi. But isn't that how evolution works? you ask. The survival of the fittest?



Trees would just shake their heads—or rather their crowns. Their well-being depends on their community, and when the supposedly feeble trees disappear, the others lose as well. When that happens, the forest is no longer a single closed unit. Hot sun and swirling winds can now penetrate to the forest floor and disrupt the moist, cool climate. Even strong trees get sick a lot over the course of their lives. When this happens, they depend on their weaker neighbors for support. If they are no longer there, then all it takes is what

would once have been a harmless insect attack to seal the fate even of giants.

In former times, I myself instigated an exceptional case of assistance. In my first years as a forester, I had young trees girdled. In this process, a strip of bark 3 feet wide is removed all around the trunk to kill the tree. Basically, this is a method of thinning, where trees are not cut down, but desiccated trunks remain as standing deadwood in the forest. Even though the trees are still standing, they make more room for living trees, because their leafless crowns allow a great deal of light to reach their neighbors.

Do you think this method sounds brutal? I think it does, because death comes slowly over a few years and, therefore, in the future, I wouldn't manage forests this way. I observed how hard the beeches fought and, amazingly enough, how some of them survive to this day. In the normal course of events, such survival would not be possible, because without bark the tree cannot transport sugar from its leaves to its roots. As the roots starve, they shut down their pumping mechanisms, and because water no longer flows through the trunk up to the crown, the whole tree dries out. However, many of the trees I girdled continued to grow with more or less vigor. I know now that this was only possible with the help of intact neighboring trees. Thanks to the underground network, neighbors took over the disrupted task of provisioning the roots and thus made it possible for their buddies to survive. Some trees even managed to bridge the gap in their bark with new growth, and I'll admit it: I am always a bit ashamed when I see what I wrought back then. Nevertheless, I have learned from this just how powerful a community of trees can be. "A chain is only as strong as its weakest link." Trees could have come up with this old craftsman's saying. And because they know this intuitively, they do not hesitate to help each other out.

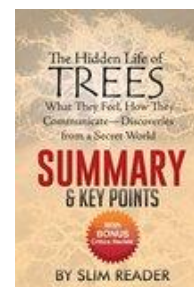
BACKGROUND & SOURCE OF THIS ARTICLE

Interview with Peter Wohlleben, forester, author of the new book, ***"The Hidden Life of Trees: What They Feel, How They Communicate — Discoveries From A Secret World."***

The Guardian: The man who thinks trees talk to each other — "Trees have friends, feel loneliness, scream with pain and communicate underground via the 'woodwide web'. Some act as parents and good neighbours. Others do more than just throw shade – they're brutal bullies to rival species. The young ones take risks with their drinking and leaf-dropping then remember the hard lessons from their mistakes. It's a hard-knock life."

Macleans: For Peter Wohlleben, trees and humans aren't so different -- "Even small children know trees are living beings, says Peter Wohlleben, despite the fact you can burn them up in a cozy log fire.

An amiable forester and the author of *The Hidden Life of Trees*, a bestseller in his native Germany—a country where forests are sunk deeply into the cultural DNA (think Grimms' fairy tales)—Wohlleben is not morally troubled by the consumption of trees."



New York Times: German Forest Ranger Finds That Trees Have Social Networks, Too — "Mr. Wohlleben, 51, is a very tall career forest ranger who, with his ramrod posture and muted green uniform, looks a little like one of the sturdy beeches in the woods he cares for. Yet he is lately something of a sensation as a writer in Germany, a place where the forest has long played an outside role in the cultural consciousness, in places like fairy tales, 20th-century philosophy, Nazi ideology and the birth of the modern environmental movement."