

The Secret Life of Trees

by Matthieu Calame

Did you think a tree was just branches and leaves? Then enter the fascinating world of spruces, lime trees and oaks, a forest in which trees support and compete with one other, thriving thanks to their boundless ingenuity.

Reviewed: Peter Wohlleben, *The Hidden Life of Trees*, Vancouver, Greystone Books, 2016.

In *The Lord of the Rings*, J. R. R. Tolkien conjures up tree-like characters, the Ents, who watch over the forests. They can move around and talk, albeit very slowly. Are Ents pure fantasy? Maybe not, according to this new book by German forester Peter Wohlleben, who invites us to re-examine our “vegetative” notion of trees.

The unknown tree

First of all, a few fascinating facts. A tree stump whose trunk was cut down four or five centuries ago stays alive, thanks to exchanges carried out with neighbouring trees. Carbon-14 dating has shown that a spruce from Dalarna, Sweden, has reached the staggering age of 9,550 years. The quaking aspen of the Fishlake National Forest, in the United States, has a shared root system that covers 43 hectares and feeds 40,000 trunks.

A tree is made up of leaves, branches and roots, but also includes the fungi with which those roots live in symbiosis in order to colonise the soil, the contact they have with roots from same-species trees, and the resulting exchanges of nutritional elements and information. When forming, a tree trunk mobilises a considerable amount of energy, but that is its way of gaining access, ahead of other plants, to the light it needs for photosynthesis, and of escaping herbivores.

The trunk carries out a rather unusual role. Even today, it is still not known how raw sap – water and minerals drawn from the earth by the roots – can reach the top of a tree 15, 25 or even 40 metres high. Made of wood, in other words an inert material comprising dead cells, it falls prey to fungi and bacteria. The same is true of living materials, whose nutrient richness is highly attractive.

To protect itself, the tree produces an extremely resistant material: bark. If the bark becomes damaged, a high-speed chase ensues. The tree must try to rebuild it before its inert tissues become seriously damaged and colonised. The strength of the tree is a decisive factor. A weakened tree (through soil compaction, water stress or any other climatic event) is at risk of losing the race.

A physical problem arises from exposure to the wind, whose force during a storm can reach 200 tons. Trees that have grown without incident have a better air penetration coefficient than the best-performing cars, provided they have no leaves left! Hence their reason for losing them in autumn – and the threat posed by summer tornados.

Social beings

Trees reveal themselves to be social beings capable of mutual help, and the forest provides the right level of observation. They form communities and have co-evolved in and for that particular environment. As such, trees generate their own protective environment. In the event of a storm, the diversity of their trunks will enhance their resistance. Trees do not all sway in the same way; they knock against each other and thus provide one other with a buffer, thereby decreasing the risk of uprooting. A monoculture of clones is far more vulnerable to tornados than a naturally dense forest.

In the event of an insect attack, a tree will secrete bitter toxins that deter the enemy from continuing its pursuit. In neighbouring trees of the same species, this elicits the production of the same toxins, protecting them against the attack in advance. This could be described as a “warning system”. Electrical messages are also thought to be transferred between root membranes. Finally, it is common for a parent tree to feed nearby offshoots through their roots while they wait, in the shade, for a large tree to fall and allow them to flourish. They provide a kind of nursery, guaranteeing renewal in due time.

We should not, however, imagine a community of altruists. Different species of trees are in constant competition for light. In the northern regions of Europe, the beech is dominant. Capable of growing in the shade of other trees, once it reaches adulthood it overtakes them and mercilessly intercepts 97% of the light. How have other species managed to coexist? The beech has its weaknesses and own needs, which allows windows of opportunity for others.

A yew tree can grow in the shade and live for a thousand years. It waits until a large neighbour dies then enjoys a century of light, after which it will wait again. The alder and willow are often content to have their feet underwater and abound in flood-prone areas. Pine trees can withstand freezing temperatures. The birch tree's strategy is simple: its seeds are exceptionally light and can spread over dozens of kilometres, taking advantage of the first light space they find in order to grow and multiply at unmatched speed. Therefore, when outclassed by slower, more powerful colleagues, it has already accomplished its reproductive mission. Finally, the oak tree is a formidable opportunist who is satisfied under a wide variety of conditions.

Each tree finds its place in time and space, bringing great stability to the forest.

The ecological functions of the forest

With the exception of pioneering trees such as birches and limes, trees like to grow in a forest within their own community, and are stressed as soon as they become isolated. For urban trees, therefore, pioneer species are preferred, adapting better to aggressive conditions (heat, pollution, solitude). But these pioneer species have in common an abundant production of very light seeds necessary for colonisation, to the great displeasure of allergy sufferers!

It is well known that forests play a major role both in constituting the atmosphere and regulating the climate. However, they also play a vital role in the rainfall regime. The water from clouds that form over the ocean cannot penetrate more than 600km over a continental landmass. Forests, through their role in constituting soils, store water in continental regions and then, through evapotranspiration, form continental clouds that penetrate further inland and enable the formation of a new forest that pursues natural colonisation. They act as a forest water front, advancing and conquering continents.

By destroying coastal forests, human beings are causing this water front to regress and, eventually, all of the continents are becoming drier. This phenomenon is already apparent in Australia and the Amazon, and has probably contributed to China's problem of accelerating desertification. In order to halt desertification, coastal forests must first be replanted.

A naturalist's plea

The functioning of forests is understood even less than that of the ocean floor, and the knowledge accumulated in recent years has profoundly undermined forestry theories. One of the misconceptions that Peter Wohlleben corrects is the idea that a plantation of young trees

(less than 100 years old) is more productive than a formation of mature trees (more than 100 years old). In actual fact, trees continually grow wider and taller, and the mass of organic matter produced per hectare is greater in natural forests than in artificial forests, where trees are usually cut down relatively young (between 50 and 120 years depending on the species) for human consumption.

Peter Wohlleben makes a compelling case for a gentler approach to forestry – the forest garden, which he sees as the forestry equivalent of organic farming – and the preservation of forest areas left to evolve naturally. He argues in favour of the recognition by law of trees as living things. One cannot help but support him on this point, while regretting that he does not make a general analysis of the use of wood in the world and the overconsumption of forest products, especially paper, although he does make brief mention of this at the end of the book.

Sustainable forest management in Europe must not come at the expense of equatorial forests. Our unquenchable thirst for paper and card is under fire, and, to use the hierarchy established by the French négaWatt association [<https://negawatt.org/>] for energy use, the order of priorities should be: sobriety, efficiency, sustainable management. No forest garden will be possible if we continue as a throw-away society. It is only by saving resources that we will be able to manage them properly. While rightly raising awareness of forestry issues, Peter Wohlleben's book fails to forcefully condemn the structural problem of our overconsumption.

The question of anthropomorphism

One of the book's strengths is the way in which it awakens our sensitivity by bringing us closer to the idea of anthropomorphism. Trees feel, suffer and communicate. Do they have brains, wonders Peter Wohlleben? His method is effective, but is he not looking at things from the wrong end? Convincing people that plants (after animals) resemble them is a misinterpretation. It is not trees and animals that resemble us, but rather it is we who belong to the great cohort of living beings and who share common traits.

Living beings maintain physical, chemical and biological relationships with their environment. Unless they want their species to disappear, they cannot afford not to respond to changes in that environment, which means having sensors, adapting their physiology and interacting with other organisms. The way in which humans communicate with their environment and those around them – through eye contact, conscious thought, speech, feelings – is a form of this general capacity of living beings.

The problem, therefore, is not knowing whether trees “feel” or “think” more or less similarly to human beings, but situating the specific way humans perceive and manage information within the diverse solutions. A little anthropomorphism can force us out of our narcissistic cocoon, but that anthropomorphism remains a consequence of our

anthropocentrism. It is not living beings that resemble humans, but rather humans who belong to the living world.

Aside from this, reading this excellent translation of Wohlleben's book will allow us to experience our next walk in the forest with even greater intensity and awe. The author happily popularises the subject and highlights the numerous works which, were it not for him, would have remained unknown to the public. Peter Wohlleben (whose name translates from German as "good living") acts as an intellectual mycelium linking the trees of knowledge. This is not too far from the great ash tree Yggdrasil, from which, according to Nordic mythology, the god Odin obtained cosmic wisdom in exchange for an eye.

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