

The role of the Invisible: Towards a synthesis between modern science and traditional knowledge in relation with trees and wood

Ernst Zürcher

Bern University of Applied Sciences
Burgdorf, Switzerland
ernst.zuercher@bfh.ch

Keywords: Tree biology, scientific methodology, traditional knowledge, archetype, magic

ABSTRACT

The analysis and experimentation of the knowledge generation process reveals that the invisible is a constitutive part of our reality. This fact helps to relativize our current unilateral materialistic modern worldview and offers a bridge towards a better understanding of traditional holistic cosmologies and practical knowledge based on them. Examples are given for different domains related to trees and wood: nature-related spirituality, anatomy, structural principles, chronobiology, moon rhythms and wood properties, subtle messages and soil fertility. Such an approach has the power of producing new synergies between tradition and modernity and brings solutions to regenerate the world in a time of global transformation.

So why the link between trees and the Invisible? This seems paradoxical concerning the most imposing beings which the world offers our eyes.

SCIENCE OF LIFE. PART VISIBLE, PART INVISIBLE

Each of us can look inside himself and discover that in fact, the Invisible is an inherent part of our immediate reality, and even more: it is essential to the construction of this reality. Let's leave routine for a moment and ask this question: How is what we call 'reality' shaped within us? We can start with the observation that we're dealing on the one hand with immediate data coming from outside and transmitted by our sensory organs and by diffuse internal feelings, and on the other hand with a thinking activity. Our sensory perceptions, always fragmentary at the outset, are not yet united by the synthesising action of thought. Without my thinking activity – invisible by nature – I cannot understand the world. The act of thinking re-establishes the original unity.

In his book *The mirages of Science*, as topical as ever, Pierre Feschotte (1990), chemical engineer and doctor of physics, and at the time professor in the Faculty of Science of the University of Lausanne, makes a convincing demonstration of the role of thought, requiring active participation of the reader. He uses for this demonstration Figure 1, leading us step by step to the observation of our own interior activity, where perception and thought lead to a synthesised unity.

Feschotte's approach distinguishes him from the influence, too rarely questioned,

of the German philosopher Immanuel Kant (1724-1804), which even now exerts a kind of self-censorship on science. He positions himself in the line of thought of Johannes Kreyenbühl⁽¹⁾ (1846-1929), Professor of Philosophy at the University and at the Polytechnic Institute of Zurich, and in particular in the line of the writings of Rudolf Steiner⁽²⁾ (1861-1925) on the process of knowledge understood from interior experience. To highlight in another way the position held – whether we like it or not – by the invisible being par excellence, thought, here is an aphorism attributed to this last author: "Even the materialist is obliged to use thought to prove that thought does not exist" (as cited in Feschotte, 1990, p. 77).

Such an approach underlines the fundamental importance in scientific research of distinguishing clearly between structure and function. Only a structure can be seen whereas a function can be no more than thought. Let's take the example of the tree to convince ourselves of this: in order to recognise in it a representative of the organic world, I have to have assimilated by thought the attributes of the organic world compared to inorganic matter; in order to recognise in the tree a perennial plant and not an annual one, I must have understood by thought the difference between a year and a decade or a century; in order to recognise in it a large structure physically rooted in the earth but physiologically in the sky,

I have to master a whole new series of concepts such as size, physical matter, physiology, sky.

WHERE MODERNITY MEETS TRADITION

In this context, we can briefly look over different approaches or disciplines dealing with trees and wood, with their characteristics and the questions they bring up.

*Between men and trees have been forged invisible and strange links, often forgotten. The role played by 'sacred trees' opens a window onto our inner life, onto the enigma of archetypes and collective memory. What is an enchanted world? Where does our sense of the sacred come from? One of the invisible connections linking men to trees evolved in the past realms related to magic, religion and spirituality, over and above all that a 'modern' mind could imagine. An impartial observation based on some recent scientific facts makes us realise that this is not simply primitive superstition, but a form of real knowledge of a somewhat enigmatic kind. This fact can be demonstrated by the example of a European species which still today retains an element of mystery: the yew (*Taxus baccata* L.).*

The largest and oldest yews are presently found mostly in British territory, some of them having an estimated age of up to 5,000 years. These remarkable specimens have probably been planted for specific reasons, closely linked to Celtic and pre-Celtic culture, of which remain megalithic sites, place names and mythological elements. Historical and ethnological documents reveal a widespread veneration of the yew, combined with magical practices. In different regions, the use of the yew in

traditional medicine is also mentioned.

Retrospectively, one question remains: How did our ancestors perceive the yew – what did they know about it? On the basis of our present scientific knowledge, we have to conclude that it was not just a matter of blind superstition. On the contrary: in this other kind of knowledge a precious impetus can probably be found towards a deeper understanding of nature.

This question and this conclusion link up with the experiments carried out by artists placing the tree at the centre of their approach. This is the case of Marion Laval-Jeantet, who is at once artist and teacher-researcher in art and ethno-psychoanalysis:

“Actually, esoteric, divinatory and similar kinds of knowledge have had a manifest utility in the survival of many societies in an age when science was less developed. Why should they be invalid today, just because science has developed? Why should there be a contradiction between this traditional knowledge and modern knowledge? This contradictory system of thought, is it not similar to that which refuses multiculturalism and espouses a unidirectional integration? A system of thought where biodiversity no longer has its place, where the tree is irremediably reduced to the rank of a consumer object? A system of thought to be urgently reconsidered” (as cited in Pique, 2013, p. 215).

The beauty and perfect functionality of structures kindles an inner amazement, as already expressed by some poets and mystics of the past. This leads to the real questions, those which concern us and to which we can bring an original, authentic reply. The tree is an ideal

subject to understand that in this approach, it is necessary to start from the whole to understand the parts. In a functional approach of anatomy, for example, the organism gives a meaning to the organ, the organ gives a meaning to the cell.

It is important to understand how, in the course of individual development but also in the course of evolution, structures and functions constantly interact. In this sense, wood structures and properties are determined by the species (genetics), modified by the age of the tree, the altitude and more specific growth conditions. Concerning physiology, it is well known that photosynthesis is a source of organic matter and oxygen. What is less well known is that the oxygen produced is 'new', deriving from the splitting of water with the help of light. What is almost entirely unknown is that photosynthesis is also a source of new water, incorporating the oxygen from the carbon dioxide absorbed from the atmosphere. What is the real significance of this triple chemical creation?

A functional interpretation of the morphology and the anatomy of trees, the study of their physiology taking into account the major flows of energies and substances, or again the observation of their development according to the principle of metamorphosis, implies that a permanent synthesis be made between the data of immediate observation and their linking using thought. In other words, the visible can only be deciphered through the invisible – often without us realising it.

Two biological principles deserve to be more closely examined, taking the tree as an example: polarity and 'spirality' (the development of spiral structures).

Trees thus open us to the strangeness of the plant world, in which numbers and geometry are present as essential elements. For Platon, Pythagoras or Kepler, they were considered as autonomous entities and had to be understood as the invisible basis of the existing world. Beyond the structures, the physiological movements are subject to similar laws, inspiring new biotechnologies. Here again amazement awaits us, as always!

Prime example of the unseen, the realm of pure thought represented by mathematics and geometry reveals surprising interactions concerning shape. We're looking here at spiral structures following the Golden Ratio Phi (ϕ), which are a consistent pattern in botany, concerning both herbaceous and perennial plants. Indeed, the positioning of leaves along the axis of the stem of all primitive higher plants (called Spermatophytes, since they form seeds) follows spirals, then being modified over the course of evolution to become distichous (on two lines the length of the axis), decussate (opposing pairs each at right angles to the last) or in whorls (by succeeding levels). Spiral structures are thus manifest in many trees, particularly in Gymnosperms, due to their archaic nature. Pine cones were probably the first plant organs to have their spiral geometry subjected to detailed analysis.

Trees can be seen as analogous to 'humans of the plant kingdom', for they can help us to feel the beating of the heart of the world – outside us and within us. Through the realisation that we belong to the same world, we can rediscover our deep rhythms and receive new strength. Indeed, haven't chronobiologists from the University Hospital of Basel (Cajochen, et al., 2013) discovered that our sleep is

strongly affected by the rhythm of the phases of the moon? These cycles can be observed even in our hormonal functions: melatonin, called 'sleep hormone', is a very powerful antioxidant secreted during the night by the pineal gland situated just behind the eyes; the levels of this hormone, responsible for regeneration processes, are doubled around the time of the New Moon compared to near the Full Moon.

In this context, rhythms that can be observed in the morphology and the physiology of trees become significant for us, if a particular accent is placed not on the solar rhythms only – the changes that are easily visible through the day or through the seasons – but rather on much subtler rhythms, often invisible for those who do not seek them: the rhythms of the trees unfolding synchronously with the movements or positions of the Moon in relation to the other celestial bodies. And once again, traditional knowledge is often validated by science.

Trees are not only a source of amazement because of their structure and their formation, but also because of the wood, their construction material. Like in chronobiology, scientists observe variations in the properties of this bio-composite material according to the date of felling, subtle but decisive for long-term use. So we have here a material, considered up to now as 'dead', presenting characteristics of a living matter. This brings us to take seriously the 'transdisciplinary' knowledge of our ancestors, as a potential source of work hypotheses for a methodology of holistic research, including all the aspects of reality.

One of the most surprising areas in which the 'unseen' bursts in is, paradoxically, that of wood – the

ultimate concrete and tangible material. Indeed, even at this level, fluctuations according to cosmic cycles can be observed in the physical, mechanical, hygroscopic and durability properties. Because of this, people realised very early on that this factor could have a decisive influence for some types of utilisation of wood – something that research is in the process of observing, while noting that these phenomena are more complex than the traditional lore would lead one to think.

A vast world, invisible but real, is opened to our senses beyond sight and touch. A fabric of interactions forms a subtle web between all living beings. Communication and empathy then assume other dimensions and we can hear unexpectedly the poet exclaim:

"Everything speaks. And now, man, do you know why

All speaks? Listen well. The fact is that winds, waves, flames

Trees, rushes, rocks, everything lives!

Everything is full of souls".

(Hugo, 1856/1911, p. 439)

Beyond the visible world perceived by our eyes and our touch, the perception of smells opens the gate to an immense landscape of infinite shades – a world invisible by nature. The sense of smell is probably the oldest and the least understood of our five main senses. Processed primarily in very ancient parts of our brain, in its instinctive 'archaic' parts, olfactory impressions are intimately linked to emotions and to

memory when they involve our conscious activity. Similarly, sounds which come to us from nature touch our subconscious in an immediate fashion. Research has only very recently revealed unexpected implications for our health.


Finally, a new partnership is possible between man and the trees, between agriculture and forestry. The first step in this direction is to understand that man and nature are not necessarily antagonistic. Through concrete, well-targeted actions, we can become (or become once again) a factor of biodiversity, contrary to the idea that nature would only become authentic again if man left it to itself. Solidarity and cooperation would thus be established over and above exclusive competition. Once again, let's take the example of the tree, where there is complementarity and mutual exchange between the roots and the mycorrhizal⁽³⁾ fungi which surround them, which benefits both parties.

Concerning the approach, it's all about moving from interdisciplinarity (academics and 'experts' discuss between themselves) to transdisciplinarity: university academic disciplines have to enter into dialogue with those with traditional knowledge, for sometimes we don't even suspect the extent of their experience and their thought categories.

BEYOND EXPECTATIONS

We have seen that a multitude of phenomena linked to trees and their interactions with their environment and with humans bring scientific explanations to our initial wonder, nevertheless the knowledge remains partial, since each answer leads to new questions. It is the facts themselves which arouse new wonder, but of another order. To this effect, Jean

Lacoste notes in his study on the "Metamorphosis of Plants" that both Goethe (1749-1832) and the Austrian philosopher Ludwig Wittgenstein (1889-1951) "seem to consider that, more than explanation, it is wonder which should remain the privileged experience of thought" (1992, 83)

Beyond this ultimate experience of thought resides a vague feeling of another kind, probably outside science's field of investigation, belonging to a more global, emotional and intuitive approach: the feeling that trees bring an essential contribution to what we might call 'the enchantment of the world'. 

NOTES

- (1) See Kreyenbühl, 1885/2008.
- (2) See Steiner, 1892/1982; 1894/1983.
- (3) Editor's note: Mycorrhiza refers to the intimate association between the filaments of a fungus and the roots of higher plants. Source: Britannica.com.
- (4) For further developments of these considerations: see Zürcher, 2016

REFERENCES

- CAJOCHEN, C., ALTANAY-EKICI, S., MÜNCH, M., FREY, S., KNOBLAUCH, V., & WIRZ-JUSTICE, A. (2013). Evidence that the Lunar Cycle Influences Human Sleep. *Current Biology*, 23(15), 1485-1488.
- FESCHOTTE, P. (1990). *Les mirages de la science*. Chatou, France: Les Trois Arches.
- HUGO, V. (1856/1911). Ce que dit la bouche d'ombre. In V. Hugo, *Les Contemplations* (pp. 438-463). Paris, France: Nelson.
- KREYENBÜHL, J. (1885/2008). Die Bedeutung der Philosophie für die Erfahrungswissenschaften. In M. Rist (Ed.), *Johannes Kreyenbühl. Aus seinem Leben und Werk* (pp. 57-72). Dornach, Switzerland: Johannes Kreyenbühl Akademie.
- LACOSTE, J. (1992). La métamorphose des plantes. *Littérature*, 86(2), 72-84.
- PIQUE, P. (2013). L'arbre visionnaire. In P. Capelle, & M. Boccara, *Voyage entre ciel et terre: Sociomythologies de l'arbre* (pp. 185-241). Agnières, France: Editions Le Temps Présent / Le Musée de l'Invisible.
- STEINER, R. (1892/1982). *Vérité et science: Prologue à une philosophie de la liberté*. Geneva, Switzerland: Anthroposophiques Romandes.
- STEINER, R. (1894/1983). *La Philosophie de la Liberté: Observations de l'âme conduites selon la méthode scientifique*. Geneva, Switzerland: Anthroposophiques Romandes.
- ZÜRCHER, E. (2016). *Die Bäume und das Unsichtbare: Erstaunliche Erkenntnisse aus der Forschung*. Aarau, Switzerland: AT.