

THE MIND OF PLANTS

**Narratives of Vegetal
Intelligence**

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SYNERGETICPRESS

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FOREWORD

In this unique anthology, the editors have invited people from a variety of backgrounds and disciplines to share their personal reflections and stories of their interactions with plants that have been meaningful in their lives. In doing so, they are not asking for a scientific treatise; those can be found in many other places, but will not be found in this collection. Instead, what the reader will find here, expressed in poetry and prose, are stories that are infused with cherished memories and inspired celebrations of unique relationships with a group of organisms that are alien and unlike us in every way, yet touch human lives in myriad ways.

Plants surround us and nurture us along with the entire community of species on the planet, whether we are paying attention or not (and we are often not). In the course of evolution, plants have mastered a rather miraculous biochemical trick: *photosynthesis*. Photosynthesis is the process whereby plants capture the energy of the sun using light-harvesting pigments (chlorophylls) and use that energy to reduce an inorganic compound, carbon dioxide (CO_2), to simple sugars. In this process, molecular oxygen (O_2), is produced as a byproduct of the reaction. Photosynthesis sustains life on earth. It is the process by which cosmic energy (solar energy) is brought into the biosphere to drive the machineries of life. It is the major means by which carbon dioxide is removed from the atmosphere and “fixed” into the biomass of organisms and by which oxygen is released into the atmosphere. This is most convenient for us and everything else that breathes because oxygen is essential to support the metabolism of (almost) all organisms (including plants, which have respiration as well as photosynthetic, carbon fixing capabilities). The simple sugars produced in the initial stages of photosynthesis are further spun into a maze of biosynthetic reaction pathways to generate a vast diversity of organic compounds. These compounds are literally the “stuff of life.” Because they have mastered photosynthesis, producing the molecules on which the rest of life depends and of which it is composed, every other living thing in the biosphere

that is not photosynthetic is effectively a parasite on plants. But plants do not seem to mind; in fact, they benefit from their relationships with less biochemically agile species in other ways. For example, they benefit from insects that pollinate them and enable them to complete their reproductive cycles. They benefit from birds and animals who consume their fruits and seeds and spread the seeds throughout the ecosystem. They benefit from humans as well, who sometimes “adopt” the plants by cultivating them, thus facilitating what must be one of the primary objectives for a plant: To grow, to spread, to reproduce. These plant relationships with insects, animals, humans, and other organisms such as fungi and bacteria, are all examples of symbiosis—close relationships between different organisms that are often mutually beneficial.

Because plants have succeeded, through photosynthesis, in tapping into the virtually limitless power of sunlight as a source of energy, they have evolved into virtuoso chemists. Energy is not a limitation on their chemical creativity. And a result of this is that plants, besides producing all the compounds on which life depends for sustenance—such as carbohydrates, lipids, and proteins—have also elaborated a vast array of complex chemical compounds that serve a signaling function that mediate their relationships with other living things in their environment. It is by means of these “messenger molecules” that plants respond to and interact with virtually all organisms in their environment. Effectively, plants substitute “biosynthesis” for behavior. If plants have language, that language is chemistry. By means of these chemically mediated signal transduction processes, plants optimize their relationships with other life-forms in their environment, from other plants, fungi and bacteria, to birds and insects, to herbivores, and included in this latter category are humans. In some instances, the message that plants express is simple: it may be saying, “stay away” by producing toxins that may range from unpalatable to lethal. Plants are very good at protecting themselves through creative chemistry. But their chemical messages can become more complex, and their interactions with other organisms more interesting, when the message is “come closer”—let’s explore forming a symbiotic relationship. It is those sorts of relationships, when the message is received by curious, big-brained primates (like us)

that the chemical conversation can become most interesting. Through the course of experimentation over evolutionary time spans, we curious primates have succeeded in discovering many plant compounds that may have evolved originally as toxins, but that we have repurposed for our own beneficial or therapeutic purposes. Thereby we respond to the plant's chemical messages in ways that the plant never "intended," but that serves the purpose of supporting the symbiotic relationship. We benefit from the pharmacological properties of the plant's compounds, and domesticate it and grow it, thus protecting it from the vicissitudes of natural selection, (albeit subjecting it to the influences of artificial selection, which may be far worse in the long run).

This chemical dialog between plants and humans can become especially interesting when the plant produces compounds that happen to target receptor networks in our hypertrophied brains that are involved in our subjective experience of consciousness and awareness. It is in these interactions that we may come closest to experiencing a "dialogue" with the plant that may resemble an ordinary human conversation. Such experiences may cause us to project human characteristics, such as personality, onto the plant, leading us to anthropomorphize them. We see this reflected, often, in reference to certain psychedelic plants where they may be referred to as "madre ayahuasca" or "grandfather peyote." While this projection may be useful in a ceremonial or ritual context, we should not be fooled. Plants may well have a kind of consciousness, but it is nothing like ours. What the psychedelic plant compounds do is target a set of receptors that mediate our subjective experience of consciousness. There is no surprise in this. Many psychoactive plant "messenger compounds" resemble brain neurotransmitters, in some cases are identical to them, although they originated in plants long before complex mammalian nervous systems evolved, and adapted them for internal, signal transduction functions, what we call "neurotransmission."

Some of the stories relayed in this anthology reflect the plant/human dialogs that can arise from symbiotic alliances with psychoactive plants. Others reflect symbiotic relationships that may not involve psychopharmacology; plants have many other ways to entice us into symbiosis. We may find them delicious; they may have a pleasing scent; they may have beautiful

flowers. All of these can be a basis for symbiosis. And all of these relationships can in some sense be attributed to plants' unique "language," chemistry, that biochemical creativity that enables them to communicate with every other organism in their environment. Though it may seem reductionist to say this, but it is not an exaggeration to say that almost everything we value about plants in the end comes down to their chemical properties.

Plants do not write stories; plants create their own stories simply in the process of living. Humans write stories about their relationships with plants, and they are reflections of their interactions with them. Chemistry almost always plays a central role in initiating and sustaining those relationships. What awaits the reader who follows the editors' suggestion to skip randomly through the selections offered here and engage with what seems most interesting (and they all, it turns out, are interesting and thought-provoking) is a rich menu of engaging and delightful stories written by humans, about their experiences with plants. In this way, perhaps, the plants in the relationship can translate their message into human language, and thereby expand our appreciation for them and the ancient co-evolutionary symbioses that they have shared, not only with humans but with the entire biospheric community of species since the dawn of time.

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