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The Ensemblist Nature of Plant Plurality

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Abstract: A core misconception about plants underlying much of the work in both plant studies and biology to currently revise it, is the designation of plants as quantifiable individuals rather than interspecies ensembles. Despite the epigenetics revolution in biology, ushering in the Extended Evolutionary Synthesis, plants and other organisms nonetheless are often observed as individual specimens with which one can tamper. In distinction to animals, which are fundamentally self-contained (even if both exosemiotically and endosemiotically their composition and signals are thoroughgoingly interspecies and elemental), plants disabuse us of the metaphysics of isolated ontologies through their radical plurality. In a mature forest, for example, it would be a mistake to cleanly demarcate where one plant ends and another begins, or were the plant ends and its fungal symbionts begin. The lessons of semiotic and thus ontological plurality and porosity plants tender also in fluctuating ways to alter our understanding of human and animal ontologies as plural.

Keywords: Phytosemiotics; Plant Plurality; ontology; plant biology; plant studies; moral extensionism

Western metaphysics and certain domains of biology have enchanted us with the notion that the rest of nature beyond humans is interchangeable, our actions are reversible; and that we can exchange one animal for another, regrow forests, and that plants are merely exemplars of their species—tokens of a type.[1] According to this logic, as long as there exist members of a species, outside the human realm individuals do not matter. This is most evident in the current movement towards the Jurassic Park-like de-extinction of animals which claims that animals can be resurrected as wholes, because their essence is not (much) more than their genes; for these alloanimals, or those other-than-human animals, cultural and behavioral historical developments play no role, the story goes. I'm sure plants are not far behind on the list, as they are even easier to reestablish if one can find sufficient pollen or seed trapped somewhere hidden. But whether a plant or animal devoid of its environmental and biological milieu is still the same plant is dubious. Hidden in the giddiness of these scientific technical feats of resurrection, is the ecological question of the Janus-face of individuality.

The semiotic scaffolding of all life, thrown into a network of relations, a species-specific *Umwelt* in the eyes of theoretical biologist Jakob von Uexküll, is especially pertinent for plants (Uexküll 2010). While von Uexküll rarely wrote specifically about plants (for he believed the animal nervous system to be the carrier of meaning-making) with the exception of his discussion of the "Protoplasm Problem" in the untranslated *Umwelt und Innenwelt der Tiere* (1909), plant biologists such as

Stefano Mancuso (2015), Anthony Trewavas (2014), Monica Gagliano (2012), and František Baluška (2007) are increasingly finding analogs to plant nervous systems through their root system (especially through the hormone auxin in plant root meristems, which also happens to be a human neurotransmitter), analogous to the decentralized nervous system of octopuses (which have 20% of their neurons in their autonomous but coordinated tentacles). Updating von Uexküll's theoretical biology to reflect the current state of plant biology, however necessary to avoid stubborn anachronisms, is not a one-way street. Inquiring into the distributed semiotic scaffoldings of vegetal life also provides the opportunity to reflect upon the supposed unity and central command of animal nervous systems as well.

A bevy of authors recently have inquired into the implications of (critical) plant studies on other fields and modes of thought. Michael Marder (2013), for example, has stressed the productive superficiality of plants (one could mention, as an antidote to the abyss of Freudian interiority), and has asked how phytocentrism might completely turn our metaphysics inside out (Marder 2014). Natasha Meyers (2012; 2015) has likewise suggested that plants serve as models of cooperative, affective "involution,"[2] rather than evolution which she views as indicative of the porous, interspecies interactions always already at play in life. Karen Houle's (2018) study of the divergent symmetries plants versus animals exhibit has also provided crucial insight into how animal design has foiled us into thinking that we could willy-nilly apply this template to plants. These and kindred humanities approaches theoretically complement the recent natural science research paradigm of plant neurobiology which provides novel insights into the hitherto unsuspected signaling capabilities of plants. These scientists and theorists in variously reference the human-like qualities in plants, and the plant-like qualities of humans, without ignoring our striking biological and semiotic differences. Taking the question of plural identities as the starting point, based on botanical physiology and ecology, this essay aims to contribute to this discourse through assessing the plant and human implications of ensemblist renderings of ontology.

With animals, it is understandable to confuse us as individuals. After all, we have seemingly discrete boundaries, and can move about discontinuous with the outside world. At first glance, it seems as if animals can move and leave others behind, self-moved and self-contained. But with plants, physically moving at a much slower pace relative to most animals, with continuous contact with the earth, the bacteria in the soil, and the various fungi populations they truck with, it is much easier to identify their plurality of being, their interdependence, their semiotic refraction.

Ontologically, plants are never individuals; although they sometimes appear so when we enfold them within our world of socially-inscribed abstract meaning, such as designating them to be national monuments like the redwood General Sherman, the biggest tree by volume in the world. For the purposes of exchange and commensurabity, however, when visiting the market, one cucumber costs as much as the next, as the different characteristics and abnormalities have been bred out of them and removed from sight. It is almost as if their variation, their plurality, their constitutive interspeciality, is threatening to the markets of humans, now globalized in peculiar ways. The liquefaction of difference which has reached a zenith in industrial production and trade under late capitalism, but has its roots in philosophical traditions reaching back to antiquity, treats nonequals as equals and multiple beings as individuals that are for all intents and purposes regarded as interchangeable.

It is clear that as long as we take the moral extensionist route of treating plants like humans or animals, we quickly find ourselves making awkward comparisons and strained analogies. Plants are not just connected to the soil, their roots tapping water, and their leaves photosynthesizing energy from the sun into metabolites, but they are also shot through with interspecies connections.

In addition to the complication of ever being able to decide where one plant (or “piece” of a plant) ends and another begins, a mereological question which we’ll explore later, is also the fact that in their native ecologies at least, many plants are entirely reliant on interspecies chains of exchange – feeding glucose to bacteria that fix nitrogen for them, and giving and receiving nutrients via mycorrhizal underground webs. Plants are never just plants, they are waystations for interspecies philandering. Inside of every plant assayed so far, endophytic mycelium also mix. Fungal and plant DNA are so interwoven in close contact, that many DNA assays have mistakenly assayed endophytic fungi instead of the plant DNA they sought to sequence (Camacho et al. 1997; Selosse and Roy 2009). Our animal sequential linearity makes little sense for plants. As much as other species serve as informants and even actants moving plant behavior, the ensemblist constitution of plants requires taking their plural ontology as a philosophical model foreign to the individualistic animal-based ontologies of western philosophy and semiotics. Plants – like human bodies composed of our hundreds of species of bacteria, protists, amoebas, nematodes, and viruses – form a structure as host for a spectrum of symbionts, mutualistic, commensualist, and parasitic. More than just a passive scaffold, however, there is a complex and indeterminate contrapuntal relationship between the plurality of plant being which can inform the radical consequences such perspectives have for the plurality of human being, complete with decentered agents physically interior and external completing these ecological beings masquerading as individual organisms.

Instead of bungling forward with what I have called a Vitruvian Man model of the organism – a static, deracinated model of the standard organism against which all other exemplars are generalized to fit on a conceptual Procrustean bed – I suggest that learning about plant plurality can help us admit our own ensemblist composition as well (Arcuri and Hendlin 2019). Calling for a genuine decentering of the Kantian-Cartesian paradigm of a mythic *anthropos* which becomes the Archimedean Point around which all other consideration, respect, and consent rest, has vast psychological, social, economic, and political implications, outside the scope of this essay. What is clear, however, is that the prevailing individual animal model does not work for dealing with difference in humans, and it falls grossly short for considering nonhuman beings.

In the last decades since the advent of modern animal rights, we have agreed as a society that sentient animals are not to be grouped in a general category of things like tables and chairs, but are in fact individuals with their own specific lives worth living, their own distinctness that morally bars us from making them utterly interchangeable (Plumwood 2002; Regan and Singer 1976).[3] Reversing centuries of legitimated instrumentalization of mammals, at least some now have a modicum of protections.[4] But the model for protecting them is deeply flawed; it is based on moral extensionism, grandfathering these other creatures into the human category of sentient. In other words, our ethics remains as Linnaean as our species taxonomies, apportioning consideration out according to some fossilized model which never mapped on to an actual body to begin with.

But what about plants? One of the primary problems we confront when considering alternative moral frameworks in plant politics is the erroneous treatment of plants as individuals rather than as thoroughgoingly plural and porous members of biotic communities. While this might work mediocrely for charismatic megaflora, for garden variety plants monistic models simply don’t cut it. This misattribution of singularity, as an extension from how we (erroneously) view humans as identified qua individuals (and miraculously independent individuals, at that), occludes and blocks methods of justly treating and attributing the constellations of networked organisms that actually compose the plural plant ontology. This is, of course, not just a problem occurring vis-à-vis plants (discussion on fungi ontology would similarly encounter differently plural representations), but it is highlighted and unavoidable when we confront the question of plant ethics.

While towering redwoods and ancient oaks deserve their place in the pantheon of individuality qua uniqueness, observing plants scientifically complicates the western metaphysical model of the individual as the prime locus of valuation and rights. Plants are always already “metapopulations” (Hallé 2002, p. 284), necessary symbionts with fungi, bacteria, and animals (insects, mostly). In fact, to conceive of plants without the cornucopia of other forms of life that compose them, is to misconceive their being completely (Shymanovich et al. 2015).

At the bedrock of Western metaphysics, this foundation of non-flux, of a permanent self, distinct from others, appears perhaps for the first time in such mathematical rendering in the Aristotelian axiom of identity, which states that A=A, even presumably, over time and space. This axiom of sameness pulls individuality in just the wrong directions, eliding the individual as a unique and thus incommensurable being, while simultaneously treating the multiple (plant) being as singular, ignoring its porosity and sensorial movement through extension despite its sessility. In this way, our faulty (ac)counting commits both conceptual and physical violence on the beings circumscribed, especially those ontologically plural.

An updated model of similarity, of identity which would acknowledge that the self is never one over time nor space, and thus, except in hypostatic abstraction, never equals itself, would conclude the much more subversive interpretation of Aristotle’s axiom as A≈A. The waves of the approximation sign admit the evolving and tangled bank of life rather the than conceptual perfection of mathematics as the most faithful measure of life in time. This process (plant) philosophy interpretation brings us some distance from the stranglehold of unity-based metaphysics which proposes to universalize and generalize phenomena at the loss of the wonder of relationality which only comes from zooming in on the present in fine detail. The plurality of relations inherent in recognizing porosity as the inevitable state of being, is certainly threatening. Being at the mercy of the wind and rain, the goodwill of microbes and mycorrhiza, the pollination of insects and birds, certainly places plants in a situation of existential precarity. But to deny that we too, petalless and leafless as we are, are subject as humans to a similar if differently constituted amount of vulnerability, sets us up for biting the stalk that feeds us, imagining the unassailable triumph of control and domination when in fact such strategies have limited and diminishing returns.

In recognizing our own sessile aspects, our limited abilities to successfully respond to events, and instead adopting various strategies of resiliency, we can also take a leaf from plants’ resourceful playbook. Amongst other strategies, ensemblist organisms such as plants rely on solidarity with complementary organisms, and engage in elaborate ceremonies of gifting which transcend strict quid pro quo relations (Hendlin 2015). For example, more than 93 species of plants proffer “extrafloral nectaries” to encourage ants, wasps, or other partnered insects to defend them when they are under attack by say, aphids or herbivory (Walters 2011; Witzany and Baluška 2012). Insect guardians can pick up on volatile organic compounds released by their partner plants emitted in distress, coming to their rescue to eat the injurious aphids or other parasites. From an evolutionary standpoint, and in Uexküll’s theoretical biology paradigm, such relationships blur the line of (say) the wasp and the orchid as individual entities. Rather, the two species form (according to Uexküll’s term) a “contrapuntal” relationship where they are both separate and not separate simultaneously (Uexküll 2010, p. 180), a epitomic instance of nondualist logic according to the Buddhist logician Nāgārjuna who marshalled his skills to overturn the prevailing metaphysics of his time. The looping nature of plants, subject to cycles as well as constructing their own niches (through succession ecology, for example), defies the dualisms of holism and monism, self and other, neither as separate nor collapsible concepts. Plants push the paradoxical tensions of taxonomizing selves, instead non-naively nurturing the potentials of their porosity.

This decentered ontology increasingly is being recognized in humans as well in the vital roles the hundreds of strands and colonies of bacteria play for our own health and survival (Montiel-Castro et al. 2013), and our increasing appreciation of our dire dependence on ecosystems and climate. Acknowledging interdependence as an ecological principle of our identity foils fantasies of idealized immunity and isolation from the other beings that compose us internally and externally, that in the end are misinterpretations of what autonomy entails.

As the Buddhist monk Thich Nhat Hanh (2009, p. 3) has written on “interbeing,” “If you are a poet, you will see clearly that there is a cloud floating in this sheet of paper. Without a cloud there will be no rain; without rain the trees cannot grow; and without trees we cannot make paper.” Updating this understanding, each moment of reading or typing on a screen milks drops of (ancient) sunlight to enable and sustain the energy of the device transmitting light to your eyes. Plants coalesce the power of time in their play with the elements. Their helio- and geotropism pulls them simultaneously in the directions of heaven and earth. Their stretching out while holding their center eccentrically generates an asymmetrical balance (Houle 2018). They engage acrobatically with gravity, drawing up water from their roots to their crown through evapotranspiration. These signs of life draw up power without concentrating it. The plurality of plants, even the majestic unified trees that appear to be icons rather than ensembles, suffuses their very action.

The remarkable process of gathering power without concentrating it perhaps offers one of the most apt lessons for human students. Plants remind us of our own ensemble nature of being, replete with the joys and trepidations accompanying reconceptualizing our own being, thoughts, and actions as plurally constructed. And their networked and relational ontologies can serve as a model for better understanding the ascription of rights and consideration not just to individuals but to clusters, both organismic and meaningful; always delicate and in-process, that collectively create identity for the individuals circulating in those groups. Ensemblist notions of identity are not ancillary representations of organisms, but for humans as for plants, contain precious insight into more fully understanding and recognizing the real subterranean ties that compose what we call individuals.

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Endnotes

1 Of course, this is also true for those groups of humans who have been denied personhood historically by rich, male Europeans. Factory workers for many decades were viewed themselves as little more than interchangeable cogs in a process, given little intrinsic value. This can be seen from the very possibility that scabs could replace union worker jobs when they engaged in strikes. Human interchangeability is also implicit in sex, gender, race, or religious stereotypes, agglomerating individuals as "them" who all act and can be thus treated the same as utterly different.

2 Hustak and Meyers (2012), drawing on the work of Isabelle Stengers, describe involution as "supplement[ing] evolutionary logics" with how interspecies (especially plant-insect) involvement shapes mutual becoming (p. 77). Thus, in entangled co-evolution, species coincidentally enfold their ways of being into each other, in a contrapuntal way reminiscent of von Uexküll's description. Speaking vis-à-vis evolutionary biology, we could say that organism niche construction occurs not only on inanimate matter, but also on and with the biological matter with whom organisms interact.

3 This has held true especially those organisms most (superficially) resembling us, or displaying intelligences most comprehensible to our own (cf. Plumwood 2002 for a critique of this). Not all philosophers, of course, would agree that nonhumans are non-interchangeable, such as, perhaps surprisingly or not, the utilitarian philosopher Peter Singer and the Kantian philosopher Tom Regan (1976).

4 But see (Andrews and Monsó 2020) on the gratuitous non-scientific "exception" we make for treating rats (and mice) instrumentally for the sake of "science." *Non-scientific* because it is well known that rats are highly social and intelligent, bonding beings; for the *sake* of science, because of the patent contradiction that animal models serve useful purposes due to their biological similarity to humans, while such instrumental use of rodents simultaneously foreswears that the experiments we put these beings through could actually be ethically suspect (because, after all, they are just rats).