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Thinking Forests in Ursula K. Le Guin's "Vaster than Empires and More Slow" and *The Word for World is Forest*

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Introduction

How might a forest think? This is a question Ursula K. Le Guin explores in "Vaster than Empires and More Slow" (1971) and *The Word for World is Forest* (1972), two stories set in strange forests on imaginary, alien worlds. Le Guin's forests are no mere settings, however, but complex, agential, sensitive, and sentient entities. Part of the Hainish series, the plots of these two novellas occur in the same universe at different points in an alternative history, in which an antecedent species of human from the planet Hain has colonised various worlds – including Earth – resulting in divergent species of human across what is known as the League of Known Worlds. In "Vaster than Empires" a team of scientists explore beyond the reaches of the League and discover the vast, vegetal consciousness of World 4470, whose biospheric sentience is an emergent property of the brain-like interconnectivity of its plant communities. In *Word*, the forest's interconnectivity includes the Athsheans, a species of human evolved to live in Athshe's forests, but who now face an existential threat from Terran (Earth-human) colonisation and deforestation.

Le Guin's stories were written during an "ecological revolution" – a "real turning point," according to historian Joachim Radkau, in the development of the modern environmentalist movement in the United States and indeed the world, demonstrated by the celebration of the first Earth Day on 22nd April 1970 (90). The "ecological revolution" was also what Radkau calls a "'Copernican turn' in reverse" in which a vision of Earth from space, such as from the photograph *Earthrise* (1969), expanded ecological consciousness of a world both "beautiful and vulnerable" (93). Le Guin's planetary perspective on ecological concerns were expressed during the 1960s and 1970s in Barbara Ward's *Spaceship Earth* (1966) and James Lovelock's and Lynn Margulis's Gaia hypothesis (c. 1972) published in the popular book, *Gaia: A New Look at Life on Earth* (1979). Concurrently, leading figures in U.S. environmentalism, such as David Brower, who broke away from the Sierra Club to launch Friends of the Earth in 1969, and microbiologist-turned-political spokesperson Barry Commoner, who featured on the cover of *Time* on 7th February 1970, represented a new form of environmentalism in which the science of ecology became increasingly popularised and politicised. Inextricable to the rise of the environmentalist movement were the civil rights movement and the anti-war movement in the New Left in the late 1960s, whose causes began to converge over the U.S. involvement in the Vietnam War (Rome 546). Anthropogenic ecological devastation or "ecocide" (coined in 1970 to describe the effects of the defoliant Agent Orange) was increasingly linked to the corporate profiteering of chemical warfare, the logic of technocratic "progress," and the histories and continuations of racism, colonialism and genocide (Zierler 15; Rome 547). Le Guin, reflecting on how her participation in anti-war protests were internalised in *Word*, explains how it became:

> clear that the ethic which approved the defoliation of forests and grainlands and the murder of non-combatants in the name of 'peace' was only a

> corollary of the ethic which permits the despoliation of natural resources for private profit or the GNP, and the murder of the creatures of the Earth in the name of 'man'. (Le Guin, "Author's Introduction", *Word* 7)

Suitably, the alien forests in Le Guin's fiction are never neutral, never pristinely distant from contemporary political contexts of domination and exploitation, ecological, capitalist, or (neo)colonial. These contexts are explicit in *Word*, implicit but no less significant in "Vaster than Empires" whose title, taken from Andrew Marvell's "To His Coy Mistress" (c. 1650-52), indicates a more subtle form of ecological imperialism. Namely, the colonising tendencies within scientific discourse towards otherworldly nonhumans.

A purely instrumentalist attitude towards forests, and the human and nonhuman communities that depend upon them, which in *Word* is epitomised by the megalomaniacal colonialist Captain Davidson, has led to unprecedented rates of deforestation around the world, exacerbating anthropogenic climate change and the Sixth Mass Extinction Event. Le Guin's stories of alien forests offer a powerful corrective to the intersectional ideologies of domination that drive global deforestation by soliciting our attention to the beauty, complexity and, perhaps, the sentience of forests here on Earth.

While the idea that an entire ecosystem such as a forest might possess sentience or the ability to think might seem a whimsical fantasy, the line between the real and the unreal is never fixed. Half a century since Le Guin's stories were first published it becomes difficult to pinpoint with any certainty which elements remain fantastic. Today, revolutionary and, in some cases, highly controversial scientific discoveries are challenging traditional and anthropocentric ways of thinking about sentience. The *Encyclopaedia of Animal Behaviour* (2010) defines sentience as "a multidimensional subjective phenomenon that refers to the depth of awareness an individual possesses about himself or herself and others." (Marino 131). The entry is explicit about the inherent bias in the way sentience is identified, admitting that "[w]hen we ask about sentience in other animals, we are asking whether their phenomenological experience is similar to our own" and that "it is important to acknowledge the possibility that other animals might have properties of sentience that humans lack" (131).

While scientists and philosophers have acknowledged the sentience of mammals and birds since at least the eighteenth century, and by the end of the nineteenth had developed the concept to describe an animal's consciousness, emotion, reason and memory as adaptive responses to the pressures of natural selection, for much of the twentieth the rise of Behaviourism inhibited further research (Duncan 11). It was not until 13th May 2021 that animal sentience was formally recognised in UK law, for example, through the introduction of the *Animal Welfare (Sentience) Bill*. Under the terms of the legislation, however, the definition of animal is restricted to vertebrates, meaning that invertebrate animals are still not enshrined in law as sentient (*Animal Welfare (Sentience) Bill*). Yet nearly a decade before the Bill was introduced, on 7th July 2012, a group of prominent neuroscientists declared that animals without a neocortex, such as invertebrates and cephalopod molluscs, *were* sentient: "[t]he absence of a neocortex does not appear to preclude an organism from experiencing affective states" ("The Cambridge Declaration"). In the same declaration, these scientists stated that certain animals with no apparent nervous system, such as sponges, placozoans, and mesozoans, are not sentient. Perhaps because of the elusive nature of phenomenological experience to an empirical method, especially in the nonhuman, the presence or absence of a certain type of skeletal or neurological system is used to

determine the existence of sentience. Controversially, scientists working in a new field they call "plant neurobiology" (first heralded in a provocative article in the 2006 issue of *Trends in Plant Science*) are calling for plants to be recognised as exhibiting "intelligent," and potentially "sentient" behaviour, despite the absence of a neurological system (Brenner et al. 414; Calvo 2858). Meanwhile, research pioneered by Suzanne Simard into shared mycorrhizal networks of biochemical communication between multiple species of plants and fungi has described these as homologous to a neurological network, suggesting a kind of sentience that emerges from complex, interconnected systems that may even transcend the traditional conception of what an individual organism is (Simard 191-213).

Whether or not one sees these arguments as valid or these analogies as helpful, it is clear that sentience is a concept born from self-knowledge. Naturally, the human remains the model against which the sentience of all other lifeforms is measured. In doing so, though, we seem to lack that "depth of awareness […] about others" used to identify sentience in other lifeforms (Marino 131). Problematically, the degree of similarity to or difference from human physiology, cognition, and behaviour has equated to the degree to which the nonhuman is considered an ethical subject. Anthropocentric conceptions of sentience mean the nonhuman must always be expected to conform to human expectations and criteria, overlooking the sheer alterity and diversity of life, the vast majority of which can be found in forests ("The State of the World's Forests" vi).

Controversial theories on plant sentience and communication in the early 1970s spread by such publications as Peter Tompkins' and Christopher Bird's *The Secret Life of Plants* (1973), has arguably renewed (albeit with greater attention to scientific verity) in light of Simard's discoveries. As Rob Nixon has observed, popular science books with names reminiscent of Tompkins' and Bird's publication, such as Colin Tudge's *The Secret Life of Trees* (2003) and Peter Wohlleben's *The Hidden Life of Trees* (2015), have proliferated in the last two decades. Suzanne Simard's work has also had a profound effect in academic circles beyond scientific disciplines, not least through the publication of her own popular science book, *Finding the Mother Tree: Discovering the Wisdom of the Forest* (2021). Anna Tsing's ethnomycological *The Mushroom at the End of the World* (2015) uses the Matsutake mushroom to unearth collaborative systems of relationship beyond and including the human in a "pericapitalist" world (63). While the David Attenborough documentary series, *The Green Planet* (2022) illuminates such phenomenon as plant electrochemical communication and symbiosis with mycorrhizal fungi to millions of viewers worldwide. The aim of this article is not to argue that plants, mycorrhizal fungi, or entire forests are sentient, nor am I claiming that Le Guin's fiction predicts such scientific arguments. Reading Le Guin's stories today has never been as important as it is now – *not* because they anticipate or prophesise scientific discoveries in some way or another, but because they provide an enduringly insightful approach to the otherness of non-human sentience without falling into the linguistic and cognitive traps of anthropocentrism or anthropomorphism still common today. The recent surge of interest in non-human sentience must be coupled with the creativity and criticality with which Le Guin herself imagined her sentient forests half a century ago. The wider point being made here is that the literary imagination can play a vital role in refining the models and metaphors used – sometimes unmindfully – by scientists today.

Le Guin's sentient forests are experimental and contemplative spaces to think carefully about how we comprehend and communicate the alien sentience of nonhuman lifeforms and attempt to translate this alienness in human terms. Assigning sentience to

the nonhuman through careless anthropomorphism, and denying sentience from the nonhuman through uncritical anthropocentrism, are approaches to the nonhuman at the polar ends of a scientific debate about sentience which has persisted despite (or perhaps because of) its continuous development as a concept. Anthropomorphism and anthropocentrism, positioned at these poles, ultimately share a common centre in which the human remains the measure of all things. Le Guin's stories are vital to read now because the ethical and ecological issues inherent in how we approach nonhuman sentience have (and will) only become more complex as scientific discourse widens the scope of what it considers to be sentient life.

I will begin in section one by examining Captain Davidson's attitude towards the forest and its denizens in *Word* as an extreme example of "hyper-separation" and how an absolute denial of sentience due to perceived essential differences, even in a species of human, is used as justification for exploitative behaviour. In the second section I will consider whether the extent of Le Guin's characters' failure to notice and value plants is justified given the perceptual fallibilities described by "plant blindness." I draw attention to the linguistic and conceptual difficulties that arise when we ascribe sentience to plants, given the concept's anthropocentric associations with individualism. Finally, in the third section, I consider the mycorrhizal network of interspecies communication between plants and fungi, likened to the interconnectivity between cells in an animal brain. This suggests consciousness may not be restricted to the permeable membrane of an organism, but a property of interconnected organisms as depicted in "Vaster than Empires". Using Eduardo Kohn's *How Forests Think* (2013) to think about the physical and psychological interconnection the Athsheans have with the forests in *Word*, I will speculate on how the human may be integrated in the interconnective ecological system of a thinking forest.

Hyper-separation

The danger of an anthropocentric understanding of sentience is that perceived absence of recognisably human-like cognition and behaviour may serve as a justification for the unethical treatment of the nonhuman. This logic is used at the very beginning of *Word* when Captain Don Davidson justifies the exploitation of the indigenous population of Athsheans, endangered local fauna, and the trees that comprise the forest, by making arguments premised on human exceptionalism and supremacism which either denies or disregards the existence of sentience in nonhuman lifeforms. Davidson does not even recognise that the Athsheans are a species of human, and so does not perceive them to be sentient in any way comparable to himself. Evoking René Descartes's "Bête machine" (*Discourse*), a concept that describes nonhuman animals as reflex-driven machines, Davidson explains to the foreman at the logging camp that when he hits the Athsheans, "it's more like hitting a robot" (*Word* 17). When he rapes them, "they don't seem to feel anything, no pleasure, no pain," comparing them to an inanimate object, "a mattress" (17). Davidson reasons that "they've got more primitive nerves than humans do. Like fish" (17) or "[l]ike some beetle you have to keep stepping on because it doesn't know it's been squashed already" (18). Le Guin, in her essay "Cheek by Jowl" (2004), is keenly aware of the intellectual history of Davidson's attitude, writing that:

> Cartesian dualism, Christian exclusivism, and behaviourist theory all have contributed for two centuries to the doctrine that animals are machines, programmed like computers, without minds, thoughts, emotions, communicative ability, even sentience – nothing in common with human

> beings – despite the curious similarities of our bodies and brains and behaviour. (345)

Davidson denies his biological and ethical kinship with the Athsheans, dehumanizing them to insentient machines who exist to be exploited.

Although the brutal simplicity of Davidson's mentality borders upon caricature, it also allows us to see the ethical and logical flaws in Cartesian thought which reasons away nonhuman sentience based on what Val Plumwood would identify as a dualistic "hyper-separation" of the human and the nonhuman (9). Plumwood's concept is insightful here because Davidson's attitude to the Other, whether that be the nonhuman, other species of human, other races of human, or women, "involves not just difference, but defining the dominant identity against or in opposition to the subordinated identity, by exclusion of their real or supposed qualities" – in this case, sentience – in order to "justify domination and conquest" (102). Indeed, in *Word*, women are instrumentalised as sex-objects, native populations are instrumentalised as slaves, endangered fauna are instrumentalised as game, and the forest itself is instrumentalised as timber. Plumwood's concept of "hegemonic centrism" posits the philosophical basis for anthropocentrism or speciesism as one and the same as colonialism and racism, attracting the interests of postcolonial ecocritics (Huggan and Tiffin 5; Plumwood 4). However, while Plumwood's "hyper-separation" and "hegemonic centrism" are useful as abstract concepts to explain in broad terms the philosophical basis of exploitation, Le Guin's portrayal of the Terran colonisation of Athshe is such that specific socio-political histories of exploitation are bought into sharp focus. In statements that call to mind attitudes of European colonisers in North America and North American imperialists in Vietnam, mixing racial and religious genocide, manifest destiny, and economic *realpolitik*, Davidson explains that the Terrans were there to wipe out the "savagery and ignorance" (13), to "end the darkness, and turn the tree-jumble into clean sawn planks" (15). Barely visible in Captain Davidson's hyper-separatist worldview, are plants. Despite the expansive stretches of forest that surround the logging camp, they remain a blur of greens and browns at Davidson's peripheral vision or seen distantly from a helicopter flying over the canopy – an image that pointedly brings to mind the Vietnam War. To Davidson, the forests of Athshe, like the Athsheans themselves, are mindless, chaotic, and primitive – a place which humans have distanced themselves from by the apparent progress of evolution. The forest is suitably dark, distant, and vague in chapter one: a "primeval murk" (13), "tree-jumble," "dark huddle and jumble and tangle of trees, endless, meaningless […] endless leaves on endless trees" (15). This is contrasted to the description at the beginning of chapter two, in which we see the forest from an entirely different angle. No longer positioned at a distance from the forest, the narrative perspective is immersed within it, making us attentive to the intricate assemblages of diverse colours, textures, shapes, and smells:

> All the colours of rust and sunset, brown-reds and pale greens, changed ceaselessly in the long leaves as the wind blew. The roots of the copper willows, thick and ridged, were moss-green down by the running water, which like the wind moved slowly with many soft eddies and seeming pauses, held back by rocks, roots, hanging and fallen leaves. No way was clear, no light unbroken, in the forest. Into wind, water, sunlight, starlight, there always entered leaf and branch, bole and root, the shadowy, the complex. Little paths ran under the branches, around the boles, over the roots; they did not go straight, but yielded to every obstacle, devious as nerves. The

> ground was not dry and solid but damp and rather springy, product of the collaboration of living things with the long, elaborate death of leaves and trees; and from that rich graveyard grew ninety-foot trees, and tiny mushrooms that sprouted in circles half an inch across. The smell of the air was subtle, various, and sweet. The view was never long, unless looking up through the branches you caught sight of the stars. Nothing was pure, dry, arid, plain. Revelation was lacking. There was no seeing everything at once: no certainty. The colours of rust and sunset kept changing in the handing leaves of the copper willows, and you could not say even whether the leaves of the willows were brownish-red, or reddish-brown, or green. (27)

Far from being devoid of life, a meaningless jumble of things to be cut down and made useful, the forest is likened to a nervous system with sensitivity, agency, and intent, "as devious as nerves." The meandering syntax of this paragraph, eddying in long sentences around colons and semi-colons, embodies the material flux of light, water, energy, the processes of decay and growth of the forest. The passage marks a shift in perspective across the two chapters, from Terran to Athshean, from detached anthropocentrism to one that is intimately integrated in the complex ecosystem of the forest. Unlike the dismissive view we get from Davidson's helicopter, there is "no seeing everything at once."

Contrasted to Davidson is the "hilfer" (an ethnographer of "high intelligence life forms" (46)), Raj Lyubov, who becomes critically distant from the cultural norms and ideologies in which he has been socialised by acquainting himself with Athshean culture in a way comparable to Le Guin's earlier ethnographic characters, such as Rocannon in *Rocannon's World* (1966) and Genly Ai in *The Left Hand of Darkness* (1969). Lyubov's familiarisation with the Athsheans and the forest itself is at the same time a defamiliarisation from the attitudes of the Terran loggers, enabling him to perceive and interact with the forest from a more appreciative and attentive perspective. Lyubov recounts how the forest appeared to him at first as, in words reminiscent of Davidson's, a "mass and jumble," "meaningless," with a "vegetable indifference to the presence of mind" (72), and similar to the description of the forest in "Vaster than Empires" which initially appears "wholly indifferent" to the Survey Team (201). However, "little by little [Lyubov] had begun to like it" so that, "after four years of it he was completely at home under the trees, more so perhaps than anywhere else" (72). The language he uses reveals not only that he has become more familiar with the forest's physical geography, but that this greater attentiveness has led to an emotional connection to the complex life of the forest that now both surrounds and includes him.

Plant Blindness

While it is easy to identify the prejudice in Davidson's denial of sentience in a species of human, it is perhaps unfair to criticise him for not attending to plants as complex, sentient lifeforms – a prejudice that is more deeply rooted owing to the radical differences between animals and plants. In Le Guin's universe, the biota of Athshe were transported from Pleistocene Earth a million years ago by the Hainish (Athshe's original colonisers, seeking to "cultivate" the wildernesses of space), while the Athsheans themselves derive from original "Hainish stock" (54) much like Terrans, possibly a result of Hainish genetic experimentation and/or evolutionary adaptation to the naturalised forests of Athshe. Le Guin creates a scenario that blurs the distinction between coloniser and colonised, terrestrial and extra-terrestrial, familiar and unfamiliar. The alien autotrophy of plants, staying in one place and photosynthesising,

makes them appear to quick-footed heterotrophs as passive, insentient, and unmoving as inanimate matter, so that the "lack of obvious movement in plants has led to incorrect suppositions about a nervous control" (Calvo 2869). Indeed, a lack of obvious movement in plants is cited as one of the factors that biologically predispose humans to fail to notice or value plants, a phenomenon Wandersee and Schlusser identify as "plant blindness." They define the term as:

> (a) the inability to recognize the importance of plants in the biosphere, and in human affairs; (b) the inability to appreciate the aesthetic and unique biological features of the life forms belonging to the Plant Kingdom; and (c) the misguided, anthropocentric ranking of plants as inferior to animals, leading to the erroneous conclusion that they are unworthy of human consideration. (3)

Wandersee and Schlusser's claim has been supported by research in visual cognition which suggests there are "fundamental differences in how the visual system processes plants that may contribute to plant blindness" (Balas and Momsen 437).

Contrary to the position that plant blindness is the default mode of human perception, however, the philosopher Mathew Hall argues plant blindness is more a "cultural-philosophical attitude" than an evolutionary predisposition (6). As we have seen, Lyubov's ethnography of the Athsheans enables him to step outside the "cultural-philosophical attitude" of the Terran loggers so that he becomes more attentive and appreciative of the forest. Even the Survey Team in "Vaster than Empires", which includes a biologist and an ecologist, appears plant blind when they first arrive on World 4470. In contrast with Davidson, it is established at the beginning of this story that animals – indeed, uncharismatic animals and insects normally regarded as vermin – have sentience and can experience their emotional states similarly to humans. We learn this through the prickly, ostracised member of the Survey Team, Osden, an "empath", whose unique powers of "bioempathetic receptivity" enable him to detect and even experience the sentience of other lifeforms: "He could share lust with a white rat, pain with a squashed cockroach, and phototrophy with a moth" ("Vaster than Empires" 172). However, vegetal sentience is not considered as a possibility before the events on World 4470 begin to unfold. When the Survey Team first land on the planet, they find only "[p]lants: infinite plants, not one species known to the visitors from the house of Man" (176), a description much like the "endless leaves on endless trees" (15) that appears in the first chapter of *Word*. The Terran "Hard Scientist," Porlock (named, perhaps, because he is World 4470's "person from Porlock" (Coleridge 460), the planet's most unwelcome and unimaginative visitor) remarks that the forest is "[a]ll the same" and therefore has "[n]o mind. No change" (176). Porlock states he dislikes the arboriforms, and Osden apparently "hates plants" (176). In much the same way as the diverse members of the Survey Team are united in their hatred of Osden, the Other of the group, the entire Survey Team (composed of multiple species of human, including two Cetians, two Hainish, one Beldane, and five Terrans) are united by their shared anthropocentrism. The parallels in the way Osden and World 4470 are othered by the members of the Survey Team intersect when Tomiko calls Osden "that damned peeled turnip" (173), while in turn Osden calls World 4470 a "damned stupid potato" (197).

The logic of hyper-separation and hegemonic centrism that underpins the colonial attitude towards the alien Other in *Word* works in this story to ostracise the neurodivergent or "insane" (169) Terran even among an otherwise tolerantly neurodiverse, multi-species group of Ekuman scientists. It is empathy, conceptualised

as an essential quality of being human, that is used to separate Osden from the group. However, this is not on account of any empathetic deficiency (as per the deeply problematic view that people with autism are "mindblind" or lack empathy) but rather Osden's "supernormal empathetic capacity," supposedly the underlying cause for the "autistic condition" (169) of his childhood (Stenning 1). Given that Osden is initially plant blind like the other scientists despite his bioempathetic capacity, plant blindness appears to be a universal cultural-philosophical attitude of the Ekumen that spans diverse species and neurological types, independent of evolutionary adaptation or psychological variation. Equally, it is Osden's very neurodivergence which enables him to see beyond the normative anthropocentrism inscribed in the cultural-philosophical attitude of plant blindness, in a way that prefigures current discussions around the relationship between neurodivergence and interspecies ethics by autistic environmentalists such as Chris Packham and Greta Thunberg (Stenning 9).

Ironically, the "plant blindness" of the Survey Team means they begin surveying, not so much what is present on World 4470, but what is absent: the "silence of a thousand million years" where "no foot had ever walked, no eye had ever looked" (176). The absence of animal life in the forest, and specifically, the absence of a perceiving human subject, makes World 4470 a "sad world" (176) to the Survey Team and perhaps a disappointing one, too. Their mission extending beyond the reaches of the League of Known Worlds to find intelligent life unknown and unfamiliar to those of Hainish descent ultimately fails for the same reason why humans have failed historically to consider the intelligence of plants here on Earth. As Stefano Mancuso and Alessandra Viola point out, if we cannot learn to recognise intelligent lifeforms alien to us and yet genetically related to us on our own planet, we cannot hope to recognise potentially intelligent lifeforms on other planets. Instead, "rather than searching for alien intelligences, we are in continual search of our own intelligence, lost somewhere in space" (Mancuso and Viola 147).

In *The Language of Plants: Science, Philosophy, Literature* (2017), Monica Gagliano, John C. Ryan, and Patrícia Vieira argue that, "in our use of language, plants are still expected to exhibit animal-*like* qualities in order to be acknowledged as sensitive living organisms, rather than being appreciated in their own right and on their own terms" (Gagliano, Ryan and Viera 14). If we do consider plants on their own terms, it becomes clear that absence of a centralised neurological system in plant physiology is advantageous to living a rooted existence, not having to rely on escaping or attacking a potential predator as animals do. Unlike animals, whose biological functions are restricted to specific organs or parts of their physiology, plants are able to have significant portions of their physiology removed and regenerate them. Mancuso and Viola points out that:

> [i]t's no accident that we continually refer to ourselves as individuals: the term comes from the Latin *in* (which here means 'not') and *dividuus* ('divisible'). Our body really is indivisible: if we're cut in half, the two halves can't live separately; they die. But if we cut a plant in half, the two parts can still live independently, for the simple reason that a plant isn't an individual. (36)

One problem with our current understanding of sentience is that it refers to something that only individuals can possess. The definition of sentience from the *Encyclopedia of Animal Behaviour* given above refers explicitly to sentience as a "subjective phenomenon." In "Vaster than Empires", there is a gradual shift in the way the Survey

Team refer to the forest sentience of World 4470 from being an individual organism to a kind of *inter*subjective *super*organism. World 4470 reminds one of the biospheric intelligence implied in Lovelock and Margulis's Gaia hypothesis being formulated at the time – except, of course, with Gaia, the line between fact and fiction can be unhelpfully ambiguous. Its metaphor about a vast cybernetic system can sometimes slip unintentionally into a more-than-metaphorical theory of planetary personality. The advantage of Le Guin's imaginative story here is that it recognises itself as such; the metaphor it uses is deliberate, its speculation self-conscious.

First, as we have seen, Porlock refers to "[s]omething – in the forest – " (176), an animal-like creature "in the trees" (180) which then becomes "sentient plants" (183). After Osden wakes up following his attack in the forest, the identity of the sentience becomes ambiguous, being referred to as both "[t]he forest – in the forest" (184). Tomiko tries to clarify, asking whether it is "[s]omething sentient?" to which Osden replies "[a] sentience" (187) and later refers to this sentience as a collective "they," nonpersonal "it" (188) or general "the sentience" (188). This eventually becomes "[o]ne big green thought" (196), calling to mind that enigmatic line in Andrew Marvell's "The Garden" (c. 1650-52): "a green thought in a green shade" (Marvell, "The Garden", line 48, 1806). Harfex, the biologist, trained in studying individual organisms, becomes exasperated at the idea: "Not 'it' […] There is no being, no huge creature, no person!" (193). The idea of "an individual organism" seems relatively straightforward until one considers the "uncertain relation between growth and reproduction" in the way plants asexually reproduce, blurring the distinction between "the growth of one continuing individual or the offspring" or the "reproduction by a single parent" (Godfrey-Smith 18). "[A]n individual", Peter Godfrey-Smith speculates, "might be an organism, a part of an organism, or a larger thing like a colony or ecological system." (19). The difficulties the Survey Team have in identifying the sentience of World 4470 illustrates the linguistic and conceptual difficulties one faces when assigning sentience, bound to an anthropocentric model of individualism, to entities like plants that are simultaneously one and many, whole and part.

Forest Consciousness

The blurring of where one individual ends and another begins in the plant kingdom becomes even more complicated when one considers the physical extent to which plants and fungi are connected. Each interface constitutes a vast, intricate web of biochemical communication through shared mycorrhizal networks, linking multiple organisms and species together. Suzanne Simard herself draws parallels between shared mycorrhizal networks and neural networks, such as the processes by which new pathways are re-configured in response to new information, and the neurotransmitter-like chemicals that are communicated between plants and fungi like synapses in a brain (191). We have already seen in *Word* that the entire forest appears as a kind of neurological system in the intersecting mesh of roots and paths, "as devious as nerves" (27). Ian Watson was perhaps first to explore the significance of the neuro-botanical metaphor in these two stories. Watson argues that the forest, in the first of these stories, "while non-sentient itself […] functions metaphorically as mind." This finds an outlet in the second, in which the forest-mind is "primarily verisimilar rather than metaphorical" (232). Certainly, Le Guin uses the metaphor more overtly in "Vaster than Empires", in a dialogue involving a fictional biologist and ecologist. At the same time, Watson's juxtaposition of the verisimilar and metaphorical belies the ways in which both stories speculate about forest sentience within and beyond a purely scientific explanation of the actual. The scientists on World 4470 must adopt new, more obscure or tentative

ways of speaking about sentience. Having discovered that plant communities of World 4470 are able to communicate to each other, the biologist, Harfex, points out that the arboriforms of World 4470 cannot be sentient because "[t]hey have no more nervous system than do plants of the Hainish Descent on Earth" (191). In response, Mannon, the ecologist, counters this by pointing out that if a neuroscientist examined "one axon, or one detached glial cell" of an animal brain as a botanist studied individual plants in isolation, it is unlikely that the scientist would detect whether "it was capable of sentience" (192). Here, the value of Le Guin's speculative imagination of forest sentience, to those who would dismiss such consideration as fanciful, is demonstrated by Manon's thought experiment. Manon and, by extension, Le Guin, suspends disbelief to challenge prevailing assumptions within scientific discourse and test the very limits of epistemological frameworks.

In a popular TED Talk, Paul Stamets, a controversial figure in mycology, states that mycorrhizal fungal networks "are extended neurological membranes […]. The mycelium is sentient." Stamets falls into the temptation of viewing mycorrhizae as brains in ways that are more-than-metaphorical. Mannon perhaps shows a more measured, sober perspective than Stamets when he suggests that "sentience or intelligence isn't a thing, you can't find it in, or analyze it out from, the cells of a brain" and that sentience is "a function of the connected cells. It is, in a sense, the connection: the connectedness" (192). Mannon does not state that the root networks of World 4470 "are extended neurological membranes", but that sentience is "in a sense" an emergent property of "connectedness," which may or may not be neurological. Mannon's comparison between a brain and a forest does not state with any certainty that the forest is literally a brain, but that a forest and a brain share "connectedness" in an analogous way.

Curiously, in "Cheek by Jowl", Le Guin identifies anthropomorphism as "an unwarranted co-option or *colonization* […] by the human" (348). Le Guin's word choice is significant because it shows that in her mind (at least at the time of writing, in 2004), the linguistic co-option or assimilation of the nonhuman Other can be likened to the cultural and political co-option or assimilation of the human Other. European empires during the nineteenth- and twentieth-centuries promoted assimilation among colonial subjects by promising citizen rights if they adopted the colonial culture, often failing to fulfil this promise (Belmessous 201). In both cases, the logic is that of Plumwood's hegemonic centrism, and the superficially beneficent gesture of recognising the rights or value of the Other conceals the damaging effects of this gesture in the way it subsumes identities, forcing the Other to transform and conform. Mannon's uncertain, careful, speculative language can be seen as avoiding the logic of hegemonic centrism by connecting human sentience and the sentience of World 4470 together, while at the same time resisting a linguistic *colonization* of its otherness.

Merlin Sheldrake flips the issue of anthropomorphic metaphors on its head by asking whether they are "humanising the plant, or vegetalising a set of human concepts?" (238). While Lynda Schneekloth argues that Le Guin "does not anthropomorphize vegetation" (250) given the associations pointed out between World 4470 and an animal brain, Mike Cadden is perhaps more accurate when he describes Le Guin's use of metaphor as an example of a "useful anthropomorphism," allowing for a more careful approach to the otherness of the nonhuman that goes beyond a simple "synthesis or separation" of Self and Other (7). In this respect, Le Guin's story is unlike the anthropomorphic representations of sentient plants in earlier post-war science fiction, such as John Wyndham's *The Day of the Triffids* (1951). The horror of World 4470 comes not from human-like motivations but from its radical otherness to human

consciousness. At the same time, fear of alterity is the emotion shared by both World 4470 and the Survey Team when each encounters the Other. This fear is overcome in the story when Osden learns to "Love the Other" (201) not in spite of but *because* of the difference that separates them. Le Guin's story of a thinking forest employs a metaphor which, in the words of Eduardo Kohn, "is able to unite disparate but analogous, and therefore related, entities. It recognizes a gap as it points to a connection" (141).

Le Guin employs the idea of a thinking forest more subtly, but no less significantly, in *Word*. In "Vaster than Empires", the forest's sentience is a function or emergent property of connectedness. But the human can also be considered to be a part of, rather than apart from, this connectedness as an active participant in the wider processes through which a forest might be said to think. Kohn mediates on this very question in his ethnography of the Runa people of the Upper Amazon, *How Forests Think: An Anthropology Beyond the Human* (2014). Daughter of the influential anthropologists Arthur and Theodora Kroeber, it is not surprising that Le Guin's *oeuvre* contains, in Baker-Cristales' view, the ethnographic impulse to "imagine difference, which serves as a powerful means of both constructing and critiquing the self" (17).

Kohn describes the Upper Amazon rainforest in which the Runa live as "a sort of shared trans-species habitus that does not observe the distinctions we might otherwise make between nature and culture" (132). Le Guin relays the similarly interdependent relationship the Athsheans have with the forests of Athshe, to the extent that it is difficult, even for Selver, the enslaved Athshean protagonist who eventually leads a revolt against the Terrans, to distinguish between the dualistic categories of "nature" and "culture." Selver has to look "closely among the live-oaks and other trees" to find the "houseroofs sticking up a couple of feet above the ground" which were "fitted in among the tree-roots like badgers' setts" (37). Contrasted to the "quickstone and plastilate Standard Issue" (20) of the Terran's Central HQ, Eshen's buildings are biodegradable, low-tech, and non-extractive constructions appropriate to the local environment: "beam roofs were mounded over with a thatch of small branches, pinestraw, reeds, earthmould. They were insulating, waterproof, almost invisible" (37). The building materials of the Terrans are described through neologisms which are suggestive of concrete and plastic – ironically, materials which typically exist for a long time in the environment. These neologisms emphasise the contrast when read beside the older, compound words that describe the biodegradable materials used by the Athsheans. We even get a glimpse of a sustainable waste-disposal system, each town having a "roosting-tree" of grey kites which act as "the garbage service" (39). In one image, Le Guin demonstrates the way the forest is both materially and culturally ingrained in the everyday life of the Athsheans, when Ebor Dendep is seen sat weaving a basket of fern stems and singing "a song about gathering ferns, a girl's song" which "trilled like a cricket's" (37). Indeed, the soundscape of the village, the "voices calling here and there and the babble of women bathing or children playing by the stream," do not dominate the acoustic ecology of the forest just like their houses do not dominate its physical ecology: the sounds of Eshen were "not so loud as the morning bird-song and insect-drone and under-noise of the living forest of which the town was one element" (38).

The forest is agential in shaping almost every aspect of the Athshean culture in a way that is completely alien to Davidson's illusory "hyper-separation" of human/culture and nonhuman/nature. Rob Latham argues that, by associating the Athsheans so closely with the forest itself, Le Guin "naturalize[s] their culture" so the violence committed against them becomes "environmental desecration" (117). He

states that Le Guin's "abiding humanism" restricts her ethics to the human and "fudges the issue" of ecological imperialism by presenting it as something only committed against the human (118-18). Latham does not seem to acknowledge "Vaster than Empires" as a story in which ecological imperialism is committed entirely against a nonhuman entity. Moreover, in *Word*, Le Guin is not so much "naturaliz[ing] their culture" as disrupting the nature/culture dichotomy on which Davidson's exploitative logic of "hyper-separation" rests, whose ecological imperialism is committed against the Athsheans and the forest *in toto*. Undoubtedly, what historian Shepard Krech III termed the "Ecological Indian" was an embedded cultural stereotype in the United States in the early 1970s, homogenising indigenous peoples as universally or essentially "closer to nature" than Western Euro-Americans (Krech). Ecocritic Greg Garrard comments that "the idealisation that would make Indians and other indigenous people models of ecological dwelling arguably derives primarily from the latter, not the former, culture" (133). Le Guin, as a white writer, appears to conform to such idealisation prevalent at the time. Equally, however, the ways in which Le Guin presents the anthropologist-figure Lyubov in *Word* shows a self-consciousness, absent in the stereotype, about the ways Westerners romanticise the cultures they have colonised – the reality that, in Lyubov's own words, "the anthropologist cannot always leave his own shadow out of the picture he draws" (75).

The connection the Athsheans have with the forest is not just a physical one, however, but a profoundly psychological one, too. The ecologies of the external and internal forest, or what the Athsheans call the "world-time" and the "dream-time" (33), are interwoven. The forest for the Athsheans does not simply "function metaphorically as mind" (Watson 232). Nor does the forest simply connote meaning like it does for the Survey Team in "Vaster than Empires" (189), suggesting a set of culturally constructed associations and secondary meanings superimposed onto the literal landscape. Changes in the "world-time" have direct effects on the "dream-time", and changes in the "dream-time" have direct effects on the "world-time" (33). This can be no better illustrated than by the fact that the Athshean word for "dream" is "root" (80): the roots of a literal tree are essential to, inseparable from, and as substantive as, its bole, branches, and leaves, just as the "dream" is to the "real." Reading this in light of the discovery of shared mycorrhizal networks, it is no wonder that the deep-rooted dreams of Athsheans constitute a collective symbiosis.

Kohn explains how to the Runa in Ávila, "dreams are the product of the ambulations of the soul. […] Dreams are not commentaries on the world; they take place in it" (140). It is interesting that Kohn describes dreams as "ambulations," for the spatio-temporal "paths, as devious as nerves" that are seen intertwining through the vegetation in the forests of Athshe are seen in Coro Mena's dreams. He tells Selver his dream in which "You have gone farthest. And at the farthest, at the end of the black path, there grows the Tree; there the fruit ripens; now you reach up, Selver, now you gather it. And the world changes wholly" (43). Earlier, Coro Mena stated that "I will never walk again that path I came with you yesterday […]. It is changed" (32) and now says the place where he and Selver meet "will be called Selver's Grove, no doubt, by the people who walk our paths hereafter" (42).

The forest appears to possess a brain-like plasticity when Selver, having learned violence from the Terrans, brings new information along the forest-paths likened to the neural pathways in a brain, so that the Athsheans may modify their behaviour in order to survive in a world that includes the violent Terrans. Even the birdsong, "whet," heard before Selver tells his story to the Athsheans in the town now becomes "'Whet Whet?'" (39). The quizzical, upward inflection of the birdsong is like a question to which there

is no reply, for the bird's repeated pattern of call seems to have been disrupted by Selver's new information which renders previous patterns of behaviour superseded. The violence the Athsheans learn demonstrates not the corruptive influence of Western civilisation on a prelapsarian Ecological Indian, nor a kind of negative feedback loop to maintain what is popularly conceived as the balance of nature, but the inevitability of flux and dynamism in any complex system, cultural and ecological. Kohn presents forests as "an emergent and expanding multilayered cacophonous web of mutually constitutive, living, and growing thoughts" in which plants and animals both repeat and change patterns of reproduction, migration, foraging, or hunting across generations, so that the forest as a total entity may be said to possess a kind of "memory" which adapts to new changes in seasons, climate, or habitat destruction (79). Kohn's employment of the word "memory" to describe ecological genetics of a forest is similarly used by scientists such as Jean Molinier et al. to describe the epigenetic mechanisms of individual plant cells, storing a "transgenerational 'memory" of environmental stress which can be passed on to the plant's progeny for future survival (1048). In Le Guin's story, we see that the Athsheans and, through them, the forests of Athshe, begin to adapt to the changing conditions on the planet brought on by the Terran colonisation. *Word* presents us with a vision of forest sentience in which a species of human is an essential constituent in securing the future of these forests.

Conclusion

The conservation of the vast majority of the planet's biodiversity and the mitigation of the worst possible scenarios of global climate change are dependent upon our relationship with forests. The power of the fantastic imagination to disrupt anthropocentric conceptions of life and extend our awareness of the beauty, complexity, and agency of the more-than-human world is epitomised by Le Guin's stories of sentient forests. "Vaster than Empires" and *Word* stimulate us to imagine forests as sites of utterly alien forms of sentience. In "Vaster than Empires" the biospheric sentience of World 4470 enables us to conceive of sentience as arising out of the interconnections between organisms in their environment, which in *Word* includes rather than excludes human communities as an interconnected part of a more-than-human world. The development of sentience as a scientific, but also a philosophical and political concept, can be characterised by an ever-widening scope of consideration to the sheer diversity and alterity of lifeforms with which we share this planet. Le Guin presents Davidson in *Word* as an extreme subject position to reveal how *a priori* denial about the sentience of nonhuman lifeforms is inherent in the objectification and destruction of forests for purely anthropocentric ends. More subtle forms of appropriation exist in the scientific discourse surrounding sentience today which, by reflex or habit, employs anthropomorphic metaphors to comprehend and communicate the sheer alterity of the nonhuman. Reading Le Guin in light of scientific debates reveal not only the sophistication of Le Guin's intellectual engagement with these issues in her fiction, but the wider value of the speculative imagination in critically refining the means by which scientists understand and explain phenomenon to a wider audience. The pertinence of Le Guin's stories to current debates around nonhuman sentience is that they explore the possibility that forests possess forms of sentience in ways that are comparable to, but nevertheless distinct from, the human. The imaginary worlds Le Guin shows us are experimental spaces in which we are able to step outside of the normative ways of thinking about our relation to forests, so that we may reimagine a more ethical relationship with forests at a time in which doing so has never been so vital.

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