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ARTICLE

Reforesting the Rhizome: Peter Larkin's 'Roots Surfacing Horizon'

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This essay foregrounds the significance of contemporary scientific accounts of mycorrhizal networks in the poetry of Peter Larkin. In contrast to critical readings that have focused on scarcity, gift, particularity, and landscape, the essay is the first study of such multiplicities and connectivity in his poetry. Commenting on a single long poem by Larkin: 'Roots Surfacing Horizon' (2008), and drawing on Deleuze and Guattari's 'rhizome' concept, the essay firstly notes Larkin's enactment of both rhizomatic and arborescent metaphorics, in a manner that simultaneously exploits mycorrhizal systems and 'reforests' the rhizome. The essay then draws out in detail the linguistic, formal, spatial, temporal and material ramifications for the poem of attendance to these mycorrhizal symbioses; and further supports this demonstration by reading an unpublished poem by Larkin entitled 'Roots on Foot/Feet in Root'. The essay subsequently effects some further theoretical contextualizations. Firstly, it compares Larkin's implied ecology of engagement to ethico-political philosophies of nonidentity. Secondly, it aligns Larkin's ecological poetics with the conceptual and descriptive dimensions of network theories, in order to examine how Larkin articulates the hybrid status of entities. Thirdly, it explores Larkin's sensuous registration of mycorrhizal differentiation as anthropocene cohabitation or 'becoming-with'. The essay concludes by emphasizing comparatively the already fully developed entanglement of Larkin's ecology, which is held to offer both a poetical and a philosophical enactment of the radical potentiality of a non-human environment for inhabitation.

In a paper published in *Nature* from 1997, forest ecologist Suzanne Simard presented some radical discoveries: plants, rather than competing for resources, were found to actually share nutrients 'within communities' by communicating information across networks.[1] These exchanges were observed not only between same-species members,

but also between different species of plants, 'link[ing] the roots of paper birches and Douglas firs in a busy, cooperative Internet'.[2] Trees, like the majority of land plants, also communicate with the help of branching networks of fungal filaments known as 'hyphae' that spread out in subterranean web-like structures. These webs connect to tree roots through 'mycorrhizal' associations. Assembled from *mýkēs* (fungus) and *rhiza* (root), the term mycorrhiza indicates a 'symbiotic, non-pathogenic association between a plant and a fungus'.[3] Mycorrhizal networks have, in recent years, caught the public imagination, partly due to the commercial success of Peter Wohlleben's *The Hidden Life of Trees* (2017), which helped popularise tree communication's 'wood wide web'.[4] However, the poetic possibilities and metaphorical ramifications of the interrelational systems of mycorrhizal networks remain nascent.

This essay reads the poetry of Peter Larkin to respond to such a complex emergent theorisation. Larkin is sometimes associated with British late-modernist poetry circles, and he was notably included in Harriet Tarlo's anthologised coterie of 'radical landscape' poets.[5] There are still few substantial studies of Larkin's poetry, with the exception of essays by Sophie Seita, John Milbank, and Jonathan Skinner. Seita examines Larkin's 'ethics of attention' through a phenomenology of the granular;[6] while Jonathan Skinner focuses on landscape in Larkin's 'post-pastoral' poetics.[7] In addition, there are some creative response works collected by Amy Cutler in 'Were X a Tree', including Milbank's reading of Larkin's onto-theological trajectories.[8] David Farrier has also recently offered some realisations in *Anthropocene Poetics* (2019), exploring Larkin's 'coppiced verse' rooted in pine plantation 'sites', which includes an interesting side point about the importance of fungi in those ecosystems.[9] Collectively, these essays focus on what they present as Larkin's major 'themes': scarcity, gift, particularity, and landscape. In my view, however, Larkin more radically explores and articulates *interrelational* meanings within environments, and I therefore offer here the first study of 'multiplicities' and 'networks' in his poetry.

Larkin is, above all, a poet of trees. Forest intricacies and plantation ecologies provide for him an attentive apparatus for thinking *with* and *through* (rather than simply *about*) the organic processes of the world. His poetry explores the 'variable tectonics of trees' by looking at 'obstructive microtextures of environment which

come between us before we identify with any sense of locality'.[10] He explores these 'between' spaces through a language of flexible formal movements and congealments, identifying more with what fibrillates in the interstices of the relational connections between things than with what 'roots' or fixates them in place. I illustrate the networked environments of Larkin's poetics through sustained commentary on a single long poem, 'Roots Surfacing Horizon' (2008), considerably overlooked by critics.[11]

Throughout this reading, I draw upon Gilles Deleuze and Félix Guattari's 'rhizome' concept, never used in any sustained critical examination of Larkin's work.[12] It is clear that Larkin's poetics enacts many radical aspects of the 'multiplicities' encouraged by the rhizome. However, I equally claim that, unlike Deleuze and Guattari, Larkin's poetics re-incorporates and even defends the 'arborescent' metaphorics of the tree, and so works through a more ecologically sensitive network of thoughts, images, and textures more complimentary to recent discoveries of mycorrhizal systems. As such, I argue that Larkin hypothetically 'reforests' the rhizome.

Roots and Rhizomes

'Roots Surfacing Horizon' is a poem about tree roots; but, intriguingly, its roots appear to behave like rhizomes. Deleuze and Guattari's 'rhizome' concept has its origins in botany and dendrology. Rhizomes are subterranean stems sending out roots and shoots from their 'nodes' – forking junctions or intersections from which buds and leaves grow. Rhizomes allow plants to colonise and spread across wide ranges of ground, propagating laterally through offshoots. For the authors of *A Thousand Plateaus*, rhizomes overcome a logic of separation and dichotomous distinction, acting instead through a 'middle' space, 'between things, interbeing, *intermezzo*'.[13] They proliferate through principles of 'connection' and 'heterogeneity', forming 'multiplicities' that extend sidelong in 'lines, strata, and segmentarities'.[14] These connecting appendages, multiplications premised on the scintillations of counter-logic, would *prima facie* also describe the internal pulse of Larkin's poetics. Yet the poet J. H. Prynne is, curiously, the only person to have made this association, and only in a very short note. Following a public reading by Larkin in Cambridge in May 2013,

Prynne issued a short response statement, briefly claiming that Larkin's language promotes 'networks of connection' that are 'interrelational' and 'not far different from the kind of rhizome structures which certain French theorists have promoted as examples of alternatives to a world of muscular agency'.[15] Prynne argues that 'muscular agency' reifies a '*mammal language*'; one that catalyses pronouns as its primary agents, and thus a language of intention and control that he claims does not apply to trees because 'trees do not have muscles' and are not, therefore, 'assertional structures'.[16] Indeed, there are hardly any personal, objective, possessive, reflexive, or intensive pronouns in Larkin's poetry. Instead, Larkin's circumambient poetics tracks the organic processes by which actual roots 'develop their own agency', which he dynamically relays through bending the 'roots of language' into complex and entangled structures.[17] This quotation, the poem's beginning, reveals how Larkin disperses the assertional agency of things to emphasise their relations instead:

> Infinitely finishing surfaces unrequitable at horizon   facing up another
> tenure how famished in extent   gives quittance to such brittle
> unsurrendering, continue long the gauze of a plain   once reft of its spore
> of root, surfaces sieve their mesh like an infill unconsigned by attainment:
> embedded horizonwards, signed offerable
>
> imprecise union where resistance engrains a non-eradication as incompletion on behalf of
>
>> roots feeding near surface
>> these pens (no orifice)
>> open an irregularity
>> of attachment-to[18]

Larkin's root-network has no predetermined finitude but instead is 'infinitely finishing', spreading out laterally by coursing '[a]long the gauze of a plain'. His elongating lines mimic this, contorting in similar ways to Deleuze's rhizome that 'operates by variation, expansion, conquest, capture, offshoots'.[19] Moreover, Larkin's root-

surface is rhizomatic in its relentless expansiveness, its 'brittle | unsurrendering', a phrase emphasising the coarse textural quality of organic outgrowths. But these outgrowths also inhabit Larkin's language semantically. The poem is covered in prefixes and suffixes, as with this quotation's '*in*fill *un*consigned' and '*non*-eradicat*ion* as *in*com- | plet*ion*'. Throughout the poem, Larkin's use of prefixes like 're-', 'un-', 'in-', or 'de-' equally enacts a continuous changing of states, connecting verbs or nouns with new qualifications of repetition, negation, entry, or deferral. This linguistic feature is more prominently accentuated later in the poem as a 'condensity' or 'co-sprawl' of roots, which help to emphasise a shift of linguistic agency from 'muscular' pronouns onto connective or mutualistic networks of prefixes.[20] In the above quotation, Larkin also reshuffles word formations and internal repetitions of the 'stems' themselves across phrases, like 'in*fini*tely *fini*shing' or the echo of 'sur*face*' in '*fac*ing'. Larkin's comparison of 'roots feeding near surface' to 'pens' clearly also stands, then, for his own grafting of prefixes onto words' 'roots' or stems, a process enabling them to crop up across the poem. These connections by 'attachment-to' recall the 'assemblages' of Deleuze's rhizome, and suggest how both linguistic and organic environments can connectively multiply.[21] An 'assemblage' is an 'intensive network or rhizome displaying "consistency" or emergent effect by tapping into the ability of the self-ordering forces of heterogeneous materials to mesh together'.[22] As such, it is not only the messily entangled, 'imprecise union[s]' of subterranean roots that 'sieve their mesh' but also the poem's textual surfaces, where their fibrillating morphemic units recall Larkin's 'microtextures of environment'.[23]

In a prose statement on his poetics, Larkin asks '[h]ow is a place stretched and folded, how is it ribbed and reinforced (lacking which it cannot project any horizon)?'[24] Deleuze's 'plane of consistency' where rhizomes converge is similar to the spatial dimensions of Larkin's root-surface.[25] In the poem's sixth section, Larkin writes:

swimming a surface with few diagnostic features vetted so far as its zest
for rim   but nowhere nearer than a cartilage of root offering the limpid
join of secondary repletion   horizon the apparent ineliminable outer
tendon

taproot seething to be recaulked at surface might no longer thirst but embroider (bewilder) the otherwise unfetchable reach of things unpitch- able breadth of the thread it brings[26]

The general formal structure of 'Roots Surfacing Horizon' approximates to a grid-like prose block; a justified section that is itself a 'middled' milieu which, in the words of Deleuze and Guattari, 'has no beginning nor end' but 'grows' and 'overspills'.[27] These blocks are punctuated by connective gaps or transition-points between long, highly-saturated and pliant phrases. Deleuze and Guattari compare rhizomes to a 'weed [that] exists only to fill the waste spaces left by cultivated areas' so that it '*grows between*, among other things'.[28] Analogously, we can see how Larkin's poetic form seeks to fill out the entirety of available space, notwithstanding blockages. But his language is less an assertional thew and more an organismic flexibility that grows in volume. The elongated 'seeth-ing' of roots therefore stretches out here in order to 'reach' across the soil-hori-zon before looping back by an act of 'thread'-like 'embroider[ing]', just as 'ten-don' and 'join' are forced over the margin and curl around back to a justified left. Larkin's phrase: 'root offering the limpid | join of secondary repletion' also implies a repeated going-over, a 'secondary' coat of roots emerging to cover or entangle a first layer. The phrase exemplifies the profuse vowels of Larkin's verse that open out the linguistic surface through their folds, like the roots' 'hive of micro-sockets' later described.[29] These phonemes equally create a high density of rhyming words that intertwine cadences across the text, including 'swim-', 'rim'; 'join', 'repletion', 'tendon'; 'embroider', 'bewilder'; 'reach', 'breadth'; 'things' and 'brings'. Together, these phonemic and rhyming ligatures carry unusual interleav-ing rhythms, which nearly coalesce in anapaestic tetrameter in the last phrase ('-pitch- | able breadth of the thread [that] it brings'). But any clearly defined order is ultimately 'unpitch- | able' – a word combining the sonic and the grounded – and instead is 'bewilder[ed]' by a wilder (and less human) rhythm that literally 'leads or goes astray'.

Restoring the Arborescent

More literally, though, Larkin's 'taproot' is not a rhizome. Deleuze argues that the metaphor of a 'taproot', from which secondary roots grow, merely extends a law of imitation where 'One becomes two'.[30] For Deleuze and Guattari, trees are also taproots with 'arborescent' logics of chains of being or *scala naturae*, which they argue are 'forever imitating the multiple on the basis of a centred or segmented higher unity'.[31] For them, tree-logic is antithetical to rhizomatic heterogeneity because the arborescent reifies Western philosophical trajectories of hierarchic order – top-down phylogenetic schemata exemplified by Ernst Haeckel's anthropocentric and genealogical diagram of the 'tree of man'. In Deleuzian terms, forests are therefore 'pseudomultiplicities'; collections of taproots and not rhizomatic linkages.[32] However, in the poem's prefatory 'Note', Larkin posits that 'the presumed verticality of roots might then be not just a matter of sustaining the trunk above, but have as much to do with the ways roots are typically displaced across a surface they also reinforce or array'.[33] The term 'array', meaning to arrange, assemble, dress, or fit out, emphasises diversity and mixtures of related elements not unlike rhizomatic assemblages. But this 'networked and (be) spoked' environment is not just lateral; it also 'reinforce[s]' a 'verticality'.[34] At the end of the poem's opening section, then, Larkin introduces 'an increase in surface verticality':

> Roots may expose less themselves than the hollowness of their embedding
> cooled at a surface's new gambit   how it can no longer play the flat
> reproducibles of release
>
> if roots knew their own secondary growth, the woody out-crop would
> undergo tertiary girth, an increase in surface verticality such roots will
> stilt the soil arch out of its remissive spread[35]

Larkin introduces verticality through the 'woody out-crop'. An 'outcrop' is an exposed area of rock sticking up from the ground, often in isolated clumps. Larkin uses it here to express upward tree growths, themselves exposures literally 'out-crop[ping]' the 'flat | reproducibles' of level ground as they shaft through them. We can therefore

read the horizontal 'remissive spread' of rhizomatic 'secondary growth[s]' as being additionally contused by arborescent verticals. In email exchanges with me, Larkin stated that 'simply to extol the horizontal is too rationalistic; too tidy, even a shade positivistic'.[36] Instead, he claimed to 'reinstate the symbolism of a double verticality, into the earth and out of the earth, which gives us both root-branching and horizontal canopy-branching'.[37] In these emails, Larkin also revealed that his realisation came from reading J. H. Prynne's 'plant-time' hypothesis, where root and stem represent bi-directional vegetal temporalities.[38] These spatio-temporal matrices lead us to note how Larkin's reinstatement of the arborescent to an otherwise rhizomatically variegated poetics is made explicit in the poem's eleventh section:

> Roots laid vertically on the pivot of a manifold,   the flaw is horizon direct
> a grounding doorless but not by retainder in the geo-outlook, there *are*
> windows of racination   though the alighting   skims skin before target,
> the curdled border is transfer-complete
>
> […]
>
>   depth that a surface buckles
>   upward without towering
>   thick owing of an horizon
>   winnowed by root
>
> A root's above-ground is not stem-like   out of its element but still not
> rhizomic, its remaining subject to a within is what gives ground before
> surface   professes ruched floor at the restrewing   be vertical by
> allowing it a propellant at its plenary corrugation[39]

If multiplicities of tree roots are 'not stem-like' while also 'still not | rhizomic', how else might we frame their 'propellant' pleating across the 'ruched floor' they remain 'subject' to? Larkin's roots intersect over a horizonal surface or forest floor that is 'manifold' (emphasised by the italicised plural of 'there *are*') where they are 'laid

vertically' (itself a vertical-horizontal coalescence). Their 'restrewing' layers form the 'depth' of a 'surface' that 'buckles | upward without towering'. Immanence is laced here with a transcendent updraft, while not effecting the 'towering' hierarchic logic of Deleuze's and Guattari's arborescent category. Throughout the poem, such clumps of shorter lines pierce the horizontal prose-field like vertical columns, performing what Larkin in the eighth section calls an 'interfacial tension, wherever roots have acquired horizontal skin they | grow to a granular vertical rebedding it'.[40] These columns, closer to standard verse forms, significantly often describe trees directly. They are indented a bar further and unjustified (producing canopy-like edges), thus typographically 'rebedding' the prose ground they are planted within and correspondingly supplant:

> root stretch has forgotten
> own tree of it, un-
> gently worms out from
> under the sample vertical
> gently wimpling in field
> another sign-wrap
> of the vertical[41]

Instructing us to '[f]ollow the plants', Deleuze and Guattari map similarly manifold surfaces: '[a]lways follow the rhizome by rupture; lengthen, prolong, and relay the line of flight; make it vary, until you have produced the most abstract and tortuous of lines of n dimensions and broken directions'.[42] However much this dimensionality supports Larkin's professed 'interest in the quantum verticality of trees or the willingness of horizons to stretch out surfaces', Larkin attempts to draw such processes towards 'something other than a sumptuous refolding'.[43] That is, his roots do not just perform Deleuzian summations or multiplications. Rather, the poem's ongoing, embedding, and bulging dimensions – 'gently worm[ing] out' and 'gently wimpling in' (like a worm's body) – also contain entry and exit points, through 'windows of racination' and 'doorless' portals. This implies a transference being relayed through

such thresholds. Larkin's 'racination' is not in the OED, but to 'racinate' is potentially the antonym of 'deracinate', meaning 'to uproot'. Unlike Deleuze and Guattari's mapping of rhizomatic multiplicity as formed by 'rupture', then, Larkin's 'windows of racination' also imply re-rooting. However, Larkin's poetics stands in opposition to the 'inherently retrophilic' aspects of 'root-seek[ing]' or ideological 'rootedness' that problematically stable or aestheticized representations of 'nature' contain.[44] Instead, Larkin's re-rooting promotes a radical openness to emergent interrelations, framed in the poem's first section as 'swollen vasculars of rigid revision (root) make sub-dermal bulges the | promotion of a soft-met horizon'.[45] By putting 'root' in parentheses, Larkin marks a typographical 'bulge' at the centre of the line, from which roots emerge on the left and the horizon emerges on the right. That phrase performs, in Larkin's own words, the 'precise textures or tangle woods of argument […] hovering around a root metaphor'.[46] In this respect, Larkin's root-networks are not rhizomatic rupturings. Instead they are described in the above quotations as 'transfer-complete'; a phrase implying a full exchange made possible by 'finite reticulation[s] that something re-enters'.[47] Larkin's 'reticulation[s]' – meaning the division or arrangement of things so as to resemble a net or network – are what enable a permeable re-entry into the root-system, itself described as a 'transmissible | commonality'.[48] Whereas Deleuze and Guattari's rhizome establishes between-ness by 'connections between fields, the removal of blockages',[49] therefore, Larkin's poetics more subtly returns to such interstices, in order to participate instead in 'the real being affirmed by means of a delicate membrane of contact'.[50]

Spore of Root

The philosopher Michael Marder argues that the 'physical verticality of trees does not mean that they are vertical in the way they live or grow'. He points out 'how some tree species share their root system' and can 'be thought of as overgrown, hyperextended grass', giving the notable example of enormous clonal root systems of quaking aspens.[51] However, while a metaphorics of hyperextension overwhelmingly supports rhizomatic multiplicities, it cannot fully account for the mutations, meshes, membranes, and bifurcations in Larkin discussed thus far. Larkin nestles the phrase

'its spore | of root' in the poem's opening section. When spoken, the phrase contains a micro-variation as 'its pore', which suggests 'membrane[s] of contact' or openings like plant stomata. In fact, Larkin describes his writing in terms of 'micro-cells or juxtapositions within the sentence-structure', thus distinguishing his poetics from rhizomatic overflow by 'includ[ing] *coprimordial* obstructions to flow'.[52] Therefore, Larkin's poetics incorporates spore-like molecular integrities as well as branch-like intertwinings, and suggests more synergetic and symbiotic processes of connection than the rhizome.

We can see, therefore, that Larkin's 'spore | of root' spawns a mycorrhizal network. Spores are vital for forest ecosystems because they produce fungi which form mycorrhizal symbioses with tree roots. In *The Mushroom at the End of the World*, Anna Tsing describes how fungi spread out in tangled cords of 'thread-like filaments, called *hyphae*' to form 'a highway system' resembling fibre-optic cables.[53] Recalling the work of tropical forester Lisa Curran, Tsing emphasises the crucial point that the existence of forests 'occur[s] only because of ectomycorrhizal fungi' because by 'leaning on fungal companions, trees grow strong and numerous, making forests'.[54] By revealing the radically mutualistic relations between plants in mycorrhizal symbioses, Tsing dispels many of the restrictive biological models that emphasize competitive individualism, from 'species-by-species reproduction' to 'self-replication' to 'predator-prey relations in which interaction meant wiping each other out'.[55] Remarkably, when Prynne states that Larkin's poetics resists 'muscular agency', he also appears to allude to the interspecies infrastructures of mycorrhizal networks. Prynne compares Larkin's lexical 'interconnections' not only to rhizomes but also to 'underground connections' of 'microbes and some kinds of fungi'.[56] In such a reading, the materiality of Larkin's poetics does not, therefore, only represent energies on, beneath or above the forest surface. In its own self-nurturing and generously vivifying movement across the page, Larkin's dramatic poem generates a mycorrhizal network for us which constitutes also an exemplary entanglement of poetics, technics, ethics and, even by extension, politics. The fungal formations and formulations central to the materiality of his work that is simultaneously semiotic, and thus a 'sign of horizon', to quote the closing lines, therefore also carry a crucial aspect of the poem's own theoretical

postulation. Larkin's emphasis on a 'coprimordial' poetics thus foregrounds a fabric of lexical co-dependence and interrelation that resembles a symbiotic plexus. These qualities are teased out in the poem's third section:

> what is 'unthought' in the flatness-decongestant ribs a stay through covering soil, sublimates inference as relational opacity rootal not neutral, the 'sub' behind this vertex versions a spell elational with surfacing, planar pull to an horizontal abrupt universal cell

> [...]

> travel of roots thwarted above their element, re-admitted but on soil-gesticular terms: guard against any over-recognition of the called from its forth   horizon as extra transfer is webbed down but as projective greeting releases the plateau's self-guiding a whole leap out

> the fronds of surface (distributive trust) become goads of plenty branching out but only as nodal as horizon was   condensity of the flat sheen surface population, what ripples is the transfer from every other density[57]

Akin to previous quoted verses, the poem's sonic network branches out from smaller phonetic units like 'sub', 'cell', 'soil', 'ver-', and 'con-'; and once again Larkin employs semantic variations by grafting or supplanting morphemes from or onto words, by transplanting 'sub' from 'sublimation' and 'elational' from 'relational'. Larkin's pre-fixes and compound words produce strange assemblages, in which verbal action is altered or a noun's thing distorted, such as 'flatness-decongestant', 're-admitted', and 'soil- | gesticular'. Moreover, his 'condensity' implies congealments and blockages, but also the fusion of densities or conglomerations of 'universal cell[s]' connecting to form 'surface population[s]'. In this respect, the poem's differential fibres of mean-ing coalesce into 'goads of plenty branching | out'. Larkin's root-extensions ('fronds of surface') are redolent of thin hyphae-like strands 'webbed down' underground, 'distribut[ing] trust' between trees. In fact, Larkin frames 'distributive trust' as though

it were synonymous with 'fronds' by placing it in parentheses. Therefore, for Larkin, 'transfer[s]' of meaning are relayed through (often proximal) 'nodal' points of repetition and difference within the poetic network, in a process later termed a 'co-sequence of over-near difference'.[58] Moreover, the linkages formed between inter-connected lexical fields reflect Larkin's own writing practices that gather together a multiplicity of discourses, ranging from 'forestry sources, but also computer technology, engineering, medicine, even dentistry', while always attempting to organise these by their resonances against a 'root metaphor'.[59] This practice is evident in lines like 'the alighting skims skin before target, | the curdled border is transfer-complete' that gather militaristic and chemical or physiological metaphors together, suggesting bullets skimming skin's 'target' and 'curdled' emulsion or blood, but nonetheless organised around arborescent 'root metaphors' of sap-congealments or vascular-dermal blockages. In fact, Larkin has expressed a broader view of poetry being 'open to relations which can't be secured out of its own wilful fabric'.[60] And his formal practice accords with such an outlook, bending language into positions where relations between lexical meanings oscillate, 'collect[ing] and knead[ing] together a lot of prior material, most of which has no organic connection with the direction of my writing'.[61]

However, for Larkin, the connections between disparate or local fields of discourse are above all 'naturalisations which don't proclaim any secret knowledge'.[62] Larkin has framed the assemblaged aspects of his poetics in Merleau-Pontian terms, where material organisms are 'patterned jumbles' or 'traps for fluctuation', which are held in a relational tensionality of invariance and flux, friction and cohesion.[63] Furthermore, Larkin's deployment of patterns of fluctuation infuses his vocabulary. He consciously extends meanings out from root metaphors towards a variety of forking conceptual branches with their own overlapping lexical fields and networks of exchange. Larkin has explained this strategy in light of 'the whole notion of "tree-theory" in maths and computing where endless ramification is both a sub-infinity and remains connected, without reabsorbing itself cyclically'.[64] Larkin's practice of 'branching' is itself a network of different conceptual fields that, in this instance, includes mathematical probability theory – where 'branching' denotes a 'stochastic'

process consisting of 'random variables', representing tensions between chance and order, quantification and unpredictability – and computational branching, which signifies the multiple instructive pathways of a computer programme enabling the generation of different code sequences. In the creation of conceptual relations and tensions, we can therefore see how the arborescent enables, for Larkin, the variable bifurcation and circulation of terms. In 'Between Branches', a poem written a year after 'Roots Surfacing Horizon', Larkin emphasises the interrelational spaces between trees as saturated with transfer, and introduces terms like 'dendrites' (from the Greek δένδρον (déndron), meaning 'tree'). In neurological terminology, a 'dendrite' is also a branch of nerves bringing information electrochemically to cells. Both readings could be interpreted as active in the following passage:

> evading dendritic weave is work of a micro-gauze, no actual twist of texture but how porousness gets between any other membraning trust in its own deed of fibre[65]

Suzanne Simard has shown that 'the topology of mycorrhizal networks is similar to neural networks' and that tree-communication is possible through 'plant cell cross-walls, plasmodesmata, and synapses at root apices', and Larkin's poetry employs similar terminology and effects.[66] His poem emphasises a multiplicity of levels of communicative agency that are active in the formation of language's connective pathways as well as their micro-intensities, by exploring 'how participation passages | at swells of static' or how 'messages leap' across interstices. I read the indented gaps of these prose blocks not merely as indicators of formal difference or breath-markers for reading, but as though they were *synapses* – tiny gaps between nerve cells in the brain across which neurotransmitters fire – here connecting grammatically non-linear associations. These lines enact an inter-penetrative 'porousness', much like the stomata within plant tissue, as an overcoming of the merely multiplying 'weave' of tree structures assumed to be singular biological organisms, and involves a participatory '*deed* of fibre', that brings in the 'membraning *trust*' of 'other' organic life. Therefore, Larkin's poetics, by way of working *with* and *through* a hypermaterialist metaphorics

of trees, has allowed us to see how a literary text might itself function like a network of trees 'on soil- | gesticular terms'.[67] In its articulations and linguistic microtextures, Larkin's language reaches towards hypermaterial granulations revealing how 'the relative density or looseness of the weave is itself an "environment" grounding what sort of a figuring nexus a literary work can become'.[68]

Larkin has generously provided me with an unpublished work written in 1987 and revised in 2018, entitled 'Roots on Foot/Feet in Root'.[69] Read as a reflective counterpart to 'Roots Surfacing Horizon', it also exemplifies a poetics of interrelations that tenders co-existence across an organic surface of contact. In 'Roots on Foot/Feet in Root', Larkin foregrounds multiple and fluctuating forms of agency like those emerging through inter-species modes of co-habitation and co-creation. The poem seems to be organised about the anthropocenic presence of an ambulatory figure positioned along a woodland surface co-populated by roots. The poem tallies the thematic ramifications of its epigraph from Coleridge – 'Huge roots intertwin'd | With wildest texture' – but Larkin also kneads the ecological alterity of wilderness towards more symbiotic, multidirectional fabrics of participation and co-construction that, crucially, do not smooth over or collapse the differences between homologous actants. Larkin does not present a multiplicity of agencies as purely discrete either, but rather blurs their attendances across thresholds of contact. Formally, the poem is written in seven parts, and employs three main structures. The fourth and sixth sections are written in Larkin's signature prose-blocks which saturate the page to the margin. The first and fifth sections are composed in a wavering and unjustified series of lines punctuated with gaps. And, perhaps most intriguingly, the second and third sections (which are conflated into one) and the seventh section of the poem are structured by two long columns of verse which run simultaneously down both the left- and right-hand margins of the page. The verses within these columns are arranged adjacently, which suggests Larkin intends them to be read contemporaneously. The second/third section begins:

feet   dubiety   roots   the

of binding function   agentless step[70]

Larkin embeds footprint-like gaps into each of the verse clusters, which stand on either side of a broad interrelational middle-ground. A junction between the emplacements of 'feet in root' and the peripatetic or even nomadic movements of 'roots on foot' underwrites the poem's performative demands to read two verse columns at once. The two conditions assume an ontological tensionality; grounded by surface and yet not sedentary. The poem thus presents a paradox of being rooted in rootlessness, only to overturn that paradox by entangling its apparent antitheses. Larkin has claimed that 'roots are for me much more than stationary feet' and it is here the local aspects of root meanings that migrate, travelling within the arborescent clusters of the poem's speculative framework.[71] Just as Larkin restores the arborescent to the rhizomatic by a manifold vertical-horizontal cross that produces diagonal out-growths, 'Roots on Foot/Feet in Root' employs a nexus which combines the processes of stepping-out with the rootedness of locality. Therefore, for Larkin, 'there are no interstices' between feet and roots 'without fixation', but 'it's that which keeps them coming on', travelling through agential networks of exchange.[72] It is this tensionality which facilitates radical interrelations of form, where '[r]eciprocity is an element | separation, an image that combs the same pattern to a number of likings'.[73] Moreover, in a manner saturating the entirety of his work, Larkin extends rhythmic and lexical patternations of linguistic 'roots' and 'feet' towards plurivocal registers of connection. Henceforth, for Larkin, any infinitely finite variational difference emerges within and against the unconditional difference of an ontological horizon. This remarkable realisation encapsulates Larkin's '[b]i-criterion network', which is concretised in the final verse of the poem's fourth section:

If not transfer-fragile at their separate holds, the looming feet stitch the spreading roots at a prime come-out (root first) only ever offered to next burdens (which the trail so far hasn't relived). As if this were a slice across horizon whose edges should loom up vertically and target a next close-down or next nearly-on again. Bi-criterion network, yes, but the paths are only multiple in the easing shape of what speckles usable roots, dusting them step by step. Feet the alias of variance, replicas by simply aligning one ramification over another, and rendering unlightly onward their resort to fork.[74]

By exploring intervallic borders between roots and feet, Larkin's poem asserts at its end that 'there are no "radical" solutions'; there are only recursive 'transfer[s]', reformulations, re-engagements, and re-entanglements. These are the processes of obstruction and re-entry which preserve difference as a 'fork[ing]' 'alias of variance' and not radical alterity. In such a respect, Larkin's root network differs from Paul Celan's dual fold of deracination and irreconcilable rootedness in 'Radix Matrix', which voids abstractions by burrowing into the ultimate vacuity of calling for 'you in the nothingness of a night, | you in the multi-night en- | countered, you | multi-you' so that the poem can excavate itself and its own hollow ground defined by 'No one's | root – O | ours'.[75] Rather, Larkin's root-feet co-sequence is a metaxological tendering of ecological interconnections, which includes both violence and nurturing contact; and the human is also a part of that system's internalizing and transferring links. Larkin reminds us that 'the paths are only multiple in the easing shape of what speckles usable | roots, dusting them step by step'. The network exists; and yet enlivenment can only come when the whole ecology of interconnections is 'speckled' or 'dust[ed]' with the pollen or spores of communicative transfer. To be rooted or emplaced within an environment is thus to be immersed in a system where things may exist equally in meta-ethical terms, while not succumbing to a flat ontology in which they equally exist. Therefore, such a co-creational entanglement both concedes and intertwines the different conditions of its actants; a process manifest in the poem's fifth section:

> what allies if not smoothings a foot makes
> *quake*   to crush the fruit at once or get underway,
> unseen spores enrol steps about a hugging globe?
>
> [...]
>
>   the intervals (less
> vacuum) keep it with themselves but rival barwise for fear of
> an emergence   that any one step extend a population, not
> another step[76]

In asking 'what allies' a foot makes when 'unseen spores enrol about a hugging globe', Larkin's poem interweaves the human (and its step) within a mycorrhizal network. Feet may smooth out the paths on which to progress, and yet that can also create connections that are *for* an agent, amounting to acting as an ally. To step across the univocal singularities of 'root' enables one to be touched by the invisible 'spore[s]' of contact and thus to materialise in a co-operative 'emergence'. An anthropocenic presence, its impact and '*quake*', need not symbolise the displacement or severing of conditions of ecological entanglement; rather it can embolden forms of contact within a 'hugging globe'. Such contact is made possible through co-creativity and care, that is not mere multiplication but a metaxological interrelation; so that 'one step' need not just replicate 'another step', but may itself assume a networking role that 'extend[s] a population'. These extracts from Larkin's poem remind us that, even if one treads on the earth in a dominant mode, superior and unseeing, one is nonetheless engaged by and involved in a collective ecosystem, so that an uncaring mobility may still be a part of an immense caring-for that generously may give to us what we do not return.

These parallel conceptualisations of Larkin's own registration of vital interdependency at least imply a political ecology of engagement that seeks to release and re-evaluate what Jane Bennett has called unambiguously 'the force of things'.[77] Bennett's ethico-political vision of the necessary elevation of all elements of vital shared materiality brings out strongly the transformation of elements and instruments in Larkin that are literally low-to-the-ground, base material, uncrowned, thwarted. Larkin's ecology can be seen in this light to effect a quite revolutionary re-prioritisation of bucolic schematics in its focus on what Bennett perceives as the 'thing-powers of resistance and protean agency'.[78] Reading Larkin in this light foregrounds the liberation dynamics inherent in 'root emergence [as] counter-stratification of surface', that is the always taut and incipiently violent rending of and within the cultured arboretum.[79] In a somewhat questionable equation, Bennett even posits vital materialism as the sanctuary or safe haven for those 'who are now, in a world where Kantian morality is the standard, routinely made to suffer because they do not conform to a particular (Euro-American, bourgeois, theocentric, or other) model of personhood'.[80] Her abstracted ethical vision of this recategorisation nonetheless, in

its attentiveness to matter, emphasizes the powerful force that pulsates in Larkin's poem, whereby 'all bodies are kin in the sense of inextricably enmeshed in a dense network of relations [and] in a knotted world of vibrant matter'.[81] Bennett would therefore locate and explicate the violence on and within the surface in Larkin's ecology as a manifestation of the violent hubris of a totalising Western philosophical tradition itself. Such violence is particularly accentuated in the ninth section of Larkin's poem, which connects to the ecological mutation and mutilation involved in the creation of plantation sites; a theme which haunts almost the entirety of Larkin's poetic corpus with the ontological tensionality of 'scarcity' as a foil to 'plenitude'. The materialist contusions of Larkin's poetics thus respond to the ecological complexities faced by any vitalism of a damaged planet. But usefully here, Bennett depicts the overcoming of such an 'ineradicable' ethical and political gap in the recognition and accessing of a 'darkly, crudely, or fleetingly' apprehension of the 'outside'.[82] This heterogeneous nonidentity resistant to or refused by representation is given a direct ethical project by Bennett, not solely in order to reach an Adornian reconcilement with impossibility, but on the contrary, as the initial recognition of human being-within as constituting a part of the vital materiality whose cognizance develops an intellectual as well as purely aesthetic being-with. As an exemplification of this project, we can see how Larkin's deep phenomenological engagement with enrootedness in this poem enacts the ethico-political discomfiture that Bennett would encourage more pedagogically as a set of educational 'techniques' leading to a philosophy of nonidentity.[83]

Towards the Mycorrhizal as Becoming-With

In the poem's 'infinitely finishing' rhizomatic reach and investigation of its matter, Larkin's ecological environment equally sustains an overall arborescent metaphorics that he elsewhere insistently calls the 'un-dislocatory differentia of a branch'.[84] To return to the poem's opening 'Note', by bringing together vertical and horizontal vectors, not just as tensions that 'reinforce or array' the forest floor but also the tensile forces 'displaced across a surface' of the page, Larkin can both release the rhizomatic potentiality of language while simultaneously re-arborealising its import as

'nurtured rather than simply induced'.[85] Larkin therefore suggests a 'horizonwards' vision of the forest as a cross-species collective that is more than a merely heterogeneous multiplicity. In a less giddy and undoubtedly less opportunistic manner, Larkin's radical depiction of hyphal distinction evinces a sustainable and 'offerable' becoming-with of fundamental attachment and interrelation. Larkin's exemplification of mycorrhizal networks moves to a more-than-metaphor enactment of the ecological other. Its ex(t)uberences do reflect the 'opening biddance of root outspanning surface', but my claim here is that, *beyond* the romantically metaphorical or resistantly rhizomatic, Larkin's language *becomes* a being-with of mycelial meaning.[86]

The hypermateriality of Larkin's own language clearly supports, indeed insists on, the radicalization of natural release. The multiple and unsettled agency of roots in his depiction suggests a relational urgency and ethical 'ebullition' in their coexistence with surface, whether back-surfacing, or bending for, or out-taking surface. While Larkin's 'surface', like his 'horizon', is both the locus and limit of subjective vision, it equally signifies an ontological plane of multiple and reciprocal actants. His entangled connection to surface appears in manifold variations as 'perform[ing] sky-level surface', 'amend[ing] depths by surface', 'knuckl[ing] surface', or 'co-plan[ing] surface'.[87] In this strain for relationality, the roots themselves partake of a combinatory identity that produces an authentic meta-ethical language of substitution; wherein roots are also 'root-shoe', 'root-chipped', 'root-burn', 'root-globe', 'root-enshallowed', 'root-tool', or 'root-horizon'.[88] And as a material means of breaching the barriers of interrelation, Larkin's language logically tests its own grammatical rules and roots. Therefore, the text bristles with near neologisms, compound terms that strain evocatively over separation, and substitutional leaps across definition, producing such remarkable clusters as: 'entirement', 'unseverance', 'reachlessness', 'enfibering', 'infra-delivery', 'proto-agulation', 'enspinement', 'interminous', 'unenvelopment', 'water-walking', 'thin-farming', 'stoop-rod', 'surface-pactive', 'pro-intrudant', 'feature-inflective', 'de-immersed', and 'de-horizontalised'.[89]

The procreativity of such language offers an ecological poetics adequate to the task of rendering 'a no longer rearable planet'.[90] Such a radical technical move also

clearly facilitates communication with various conceptual dimensions of network theories, including in the Latourian sense of no longer being able innocently to posit 'transportation without deformation', or stasis and security of postulation, or performational permanence, and equally of not assuming that agency occurs only within and across human actors.[91] Additionally, Larkin's poem manages to incorporate all three of the phases – nature, (social) fabric, and semiotic construction – that Latour regards as resources developed over the ages to deal with agencies, the precise capillary character that he attributes to modern social interactivity, complete with his own vocabulary of 'netting, weaving, lacing, twisting' and even 'embranchments', the rapid dissolution of axiological distinctions (distance versus proximity, micro- versus macro-, top versus bottom, inside versus outside), the move from topological to dynamic and ontological properties (most obviously in terms of non-human actants), the hybrid status of all entities, and thereby the transformed relation of analysis to involvement. Latour's summary of this final realisation could serve as a basic description of the technics of Larkin's engagement: '[e]xplanation is ex-plicated, that is unfolded, like gravity in Einstein's curved space, it is still there as an effect but it is now indistinguishable from the description, the deployment of the net'.[92] In Larkin I read this as the being-with that supersedes representation with enactment.

Such a departure from specific homogeneous morphism, as viewed technically by Latour, easily connects conceptually to the inter-species becoming-with investigated ethically by Donna Haraway in *When Species Meet*.[93] Foregrounding interspecies, multidirectional and symbiogenetic forms of co-shaped existence, Haraway develops Scott Gilbert's critique of the self-building and self-maintaining assumptions of autopoeisis in favour of the postulation of an epigenesis that is fundamentally 'in and between always-in-process'.[94] This alternative vision of co-construction and recursivity posited by Haraway is significantly not presented as a sacral communion but as something that is precisely prosaic and mundane.[95] It is this real being-with, pursued here by Haraway as a detailed description of interspecies cohabitation, but essentially involving all senses in a non-abstract '[a]ccountability, caring for, being affected, and entering into responsibility', that resonates strongly with Larkin's own

equally sensuous registration of mycorrhizal differentiation as evidence of anthropocene cohabitation. Haraway's ethical affirmation that 'we are in a knot of species coshaping one another in layers of reciprocating complexity all the way down' is an accurate description, in response and respect, for the human-natural, and non-human inter-natural networks of entanglement, care, nurturing and being-for that Larkin's poem both represents and beyond representation becomes.[96]

   To conclude by elucidating Larkin's poem via such ambitious and themselves inspiring theorisations of network or interspecies entanglement, however, is not remotely to present the poetry as the mere illustration or aesthetic rendition of a conceptual realization. To the contrary, the theorists' more schematic and ultimately constructivist projections highlight the already fully developed entanglement of Larkin's ecology: one in which the *root*, *surface* and *horizon* of lived ideation are fully co-emergent and 'transfer-complete'. 'Roots Surfacing Horizon' can therefore stand as both a poetical and a philosophical aspiration, in its 'infinitely finishing' and 'unrequitable' 'sponsoring'. Therefore, in the words of the poem's final section, it is an enactment of the 'radical gleaning' of a non-human environment that also enables the fuller potential inhabitation of a '[h]uman as strange as rooted' connectedness.[97]

Notes

[1] Suzanne Simard, 'Net transfer of carbon between ectomycorrhizal tree species in the field', *Nature* (388), 1997, pp.579–582 (580).

[2] Suzanne Simard, 'Note from a Forest Scientist', afterword to *The Hidden Life of Trees*, p.248.

[3] E. I. Newman, 'Mycorrhizal Links Between Plants: Their Functioning and Ecological Significance', *Advances in Ecological Research* (18), 1988, pp.243–270 (243).

[4] Peter Wohlleben, *The Hidden Life of Trees* (London: Harper Collins, 2017).

[5] *The Ground Aslant: An Anthology of Radical Landscape Poetry*, ed. Harriet Tarlo (Exeter: Shearsman Books, 2011).

[6] Sophie Seita, 'Ethics of Attention in Peter Larkin's *Leaves of Field*', *Cordite Poetry Review* (December 2013), http://cordite.org.au/scholarly/the-ethics-of-attention/.

[7] Jonathan Skinner, 'Thoughts on Things: Poetics of the Third Landscape', *)((eco(lang)(uage(reader))*, ed. Brenda Iijima (New York: Portable Press at Yo-Yo Labs and Nightboat Books, 2010), pp.9–51.

[8] 'Were X A Tree: Commentary and Marginalia Beside and Between the Poetry of Peter Larkin', ed. Amy Cutler (2018), https://warwick.ac.uk/fac/arts/english/research/currentprojects/poetryatwarwick/onlinepublications/werexatree/.

[9] David Farrier, *Anthropocene Poetics* (Minneapolis: University of Minnesota Press, 2019), pp.55–70.

[10] Peter Larkin, 'Fully From, All Scarce To', *)((eco(lang)(uage(reader))*, pp.52–59 (55).

[11] Peter Larkin, 'Roots Surfacing Horizon', *Lessways Least Scarce Among: Poems 2002–2009* (Bristol: Shearsman Books Ltd, 2012), pp.131–168.

[12] Gilles Deleuze and Félix Guattari, *A Thousand Plateaus* (1987), trans. Brian Massumi (London: The Athlone Press, 1988).

[13] Ibid., p.25.

[14] Ibid., p.4.

[15] J. H. Prynne, 'On Peter Larkin', *No Prizes* 2 (2013), pp.43–45 (44).

[16] Ibid., p.43. Prynne's italics.

[17] Ibid., 45.

[18] Larkin, p.135.

[19] Deleuze and Guattari, p.21.

[20] Larkin, pp.141–142.

[21] Deleuze and Guattari, p.21.

[22] Mark Bonta and John Proveti, *Deleuze and Geophilosophy* (Edinburgh: Edinburgh University Press, 2004), p.54.

[23] These concepts are also evident in Larkin's practice as a reader. He interprets Wordsworth's poetics, for example, as a 'pervasive texture [that] offers us not just pinpoints but the uncertain behaviour of frames and meshes'. See: Peter Larkin, *Wordsworth and Coleridge: Promising Losses* (New York: Palgrave Macmillan, 2012), p.50.

[24] Larkin, 'Fully From, All Scarce To', p.55.

[25] Deleuze and Guattari, p.4.

[26] Larkin, 'Roots Surfacing Horizon', p.150.

[27] Deleuze and Guattari, p.21.

[28] Ibid., p.19.

[29] Larkin, p.150.

[30] Deleuze and Guattari, p.5.

[31] Ibid., p.16.

[32] Ibid., p.8.

[33] Larkin, p.133.

[34] Ibid.

[35] Larkin, p.135.

[36] Email from Larkin, 4th March 2019.

[37] Email from Larkin, 7th March 2019.

[38] Larkin here refers to J. H. Prynne's 'The *Plant Time Manifold Transcripts*', *Poems* (Northumberland: Bloodaxe, 2015), pp.233–242.

[39] Larkin, pp.163–164.

[40] Larkin, p.155.

[41] Larkin, p.145.

[42] Deleuze and Guattari, p.11.

[43] Larkin, 'Preface', *Lessways*, p.8.

[44] Christy Wampole, *Rootedness: The Ramifications of a Metaphor* (Chicago: The University of Chicago Press, 2016), p.7.

[45] Larkin, p.136.

[46] Edmund Hardy, 'Less than, more at: an interview with Peter Larkin', *Intercapillary Space* (2006), http://intercapillaryspace.blogspot.com/2007/11/less-than-more-at-interview-with-peter.html.

[47] Larkin, p.137.

48 Larkin, p.136.

49 Deleuze and Guattari, p.12.

50 Hardy, http://intercapillaryspace.blogspot.com/2007/11/less-than-more-at-interview-with-peter.html.

51 Michael Marder, *Grafts: Writings on Plants* (Minneapolis: University of Minnesota, 2016), p.136.

52 Hardy, http://intercapillaryspace.blogspot.com/2007/11/less-than-more-at-interview-with-peter.html.

53 Anna Tsing, *The Mushroom at the End of the World* (New Jersey: Princeton University Press, 2015), p.137–139.

54 Ibid, p.138.

55 Ibid., p.139.

56 Prynne, p.44.

57 Larkin, p.141.

58 Larkin, p.144.

59 Hardy, http://intercapillaryspace.blogspot.com/2007/11/less-than-more-at-interview-with-peter.html.

60 Ibid.

61 Ibid.

62 Email from Larkin, March 14th 2019.

63 Ibid. Larkin's quotations are from Maurice Merleau-Ponty's *In Praise of Philosophy and Other Essays* (1953), trans. John Wild, James Edie, and John O'Neill (Evanston, IL: Northwestern University Press, 1970), p.196. Within the phenomenological frameworks habitually used to discuss Larkin's poetry, one might pursue a deeper Merleau-Pontian analysis of depth and exteriority in the poem, particularly in response to the terms 'horizon' and 'surface'. Indeed, such a study of Larkin's observational subject-positions could further complicate the philosophical and hermeneutic categories of other phenomenologists and reception theorists, especially Hans Robert Jauss's 'horizon of expectation' and Hans-Georg Gadamer's 'fusion of horizons'. Although such a critical task requires exposition beyond the parameters of this essay, I address other uses and implications of Larkin's 'horizon' and 'surface' towards my conclusion. I am grateful to an anonymous reader for suggesting these lines of analysis.

64 Email from Larkin, March 7th 2019.

65 Larkin, p.173.

66 Suzanne Simard, 'Mycorrhizal Networks Faciliate Tree Communication, Learning, and Memory', *Memory and Learning in Plants*, ed. Frantisek Baluska, Monica Gagliano, Guenther Witzany (Cham, Switzerland: Springer International Publishing, 2018), p.191; p.194. A plasmodesma is a thread of cytoplasm linking plants' cell walls and enabling them to communicate.

67 Larkin, p.141.

68 Larkin, 'Fully From, All Scarce To', p.56.

69 Larkin, 'Roots on Foot/Feet in Root' (1987; 2018); pp.1–17. Unpublished work; see bibliography.

70 Ibid., p.6.

71 Email from Larkin, March 14th 2019.

72 'Roots on Foot/Feet in Root', pp.9–10.

73 Ibid., p.10.

74 Ibid., pp.9–10.

75 Paul Celan, *Selected Poems*, trans. Michael Hamburger (London: Penguin Books, 1996), p.191.

76 'Roots on Foot/Feet in Root', pp.11.

77 Jane Bennett, *Vibrant Matter. A Political Ecology of Things* (North Carolina: Duke University Press, 2010) p.12.

78 Ibid., p.13.

79 Larkin, 'Roots Surfacing Horizon', p.145.

80 Ibid.

81 Ibid.

82 Ibid.

83 Ibid., pp.15, 17.

84 Larkin, 'Fully From, All Scarce To', p.55.

85 Larkin, 'Roots Surfacing Horizon', p.133.

86 Ibid., p.151.

87 Ibid., pp.135–138.

88 Ibid., pp.152–168.

89 Ibid., pp.152–168.

90 Ibid., p.146.

91 Bruno Latour, 'On actor-network theory. A few clarifications, and more than a few complications', *Soziale Welt*, 47 (1996): 369–81.

92 Ibid., p.376.

93 Donna J. Haraway, *When Species Meet* (Minneapolis, University of Minnesota Press, 2007).

94 Ibid., p.32.

95 Ibid., p.36.

96 Ibid., p.42.

97 Larkin, p.167.

Competing Interests

The author has no competing interests to declare.