Becoming Non-human/Designing Non-human - Interalia Magazine

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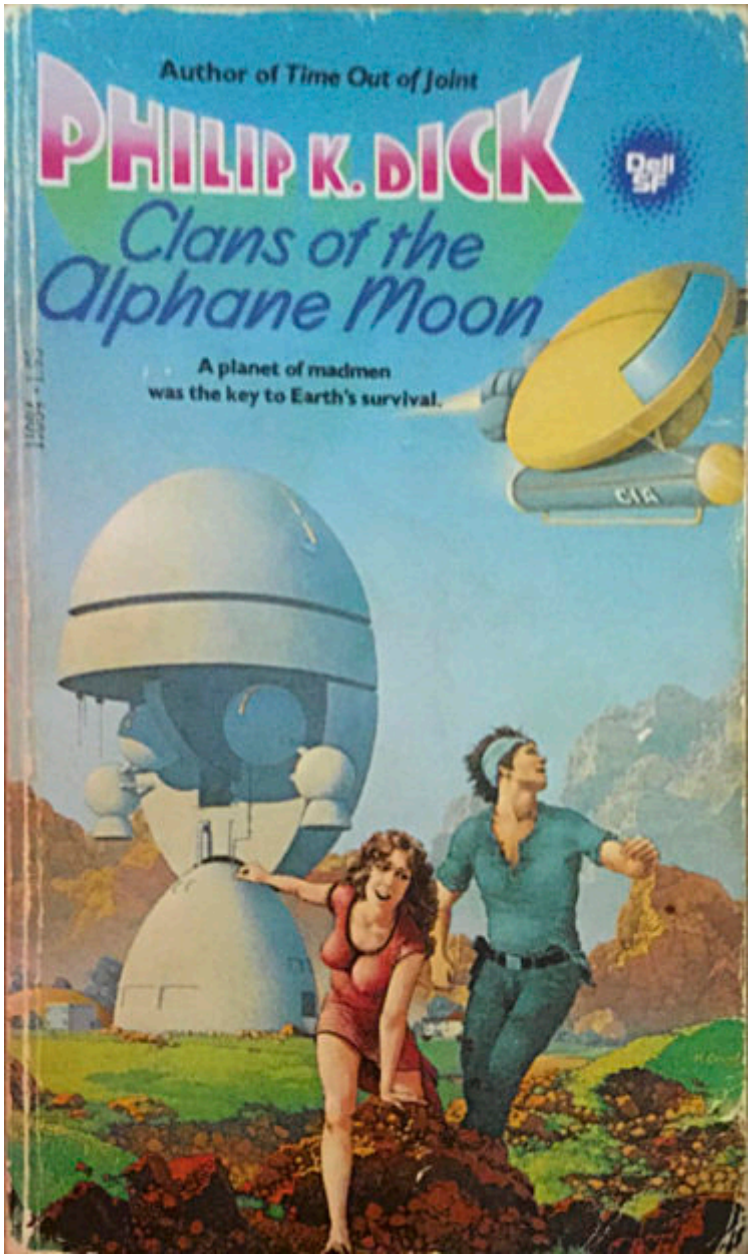


No Terran is an island." – Lord Running Clam

For the last couple of years, I have been collaborating with a spirited entity, a slime mold I have named Lord Running Clam, in honour of my favorite character in Philip K. Dick's *Clans of the Alphane Moon*. Dick's Lord Running Clam is an itinerant slime mold who hails from Ganymede and acts as a kind of go-between for a community of agoraphobes hiding out in a San Francisco rooming house. LRC oozes back and forth beneath their tightly closed doors, gossiping telepathically and running a thriving business in postage stamps and uncut gems. *My* version of LRC takes the form of a lacey yellow growth that fans out across the agar of a petri dish. It extends a filigree of tendrils toward the flecks of oatmeal I drop in front of it, gradually engulfs them over the span of a few hours and then oozes on in search for more. 'Mold' is a misnomer for this organism as it is in fact a social amoeba or rather a single ameboid supercell that consists of a swarm of nuclei streaming through a shared blob of protoplasm like faces carried along in a crowd. Though it lacks a nervous system or any other kind of centralized brain, this humble entity is capable of making complex decisions and learning from its experiences. Taxonomically LRC is known as *Physarum polycephalum*, literally 'the many headed slime'. Though we can categorize it into our systems of ontology, we can only conjecture how this simple organism experiences its world. What would it be like to *be* Lord Running Clam–there in a petri dish, experiencing a set of stimuli that includes *me,* looking down from on high, dropping flakes of oatmeal to elicit a response?

wild slime mold

I first came upon one of these curious entities on a footpath through the British Columbia rainforest. The vivid, sulfur yellow mass was in stark contrast to the viridian moss that carpeted the damp forest floor. I was surprised to notice that what I had assumed to be some kind of sedentary, fungus was leaving a slime trail behind, the way a snail or a slug does.

This thing was *moving* –albeit very slowly.

After doing a bit of research I discovered the slime trail functions as a sort of external memory, reminding the slowly streaming mass where it has already been, optimizing efficiency in its relentless search for food. *Physarum* has garnered the status of poster organism for studies in *emergence*, which is the phenomenon wherein simple signals propagate through a swarm of interconnected individuals, imparting the collective with a responsive reasoning

capability, far more powerful than that of any one member of the group. The flocking behavior of birds is classically emergent, epitomized by such phenomena as the great seething 'murmurations' of starlings that fly together in a an ever-changing formation of thousands of individuals, or shoals of tiny fish like herring or sardines, or freeway drivers navigating rush hour traffic. Though brainless and nerveless, a streaming *Physarum* supercell can find its way through complex mazes and easily solve what is called the 'shortest path problem' by reckoning the most efficient network linking disparate points, as in scattered towns that need to be connected by a road network. This useful trick of *Physarum* has been utilized by human designers modelling roads and subway systems[1], as long as the points they are trying to get connected are represented by oatmeal flakes, which *Physarum* really, really likes!

The more I thought about it, the more I realized this ignominious little yellow blob, so alien to us in appearance, something most people wouldn't even *imagine* relating to, nevertheless shares with us some important attributes. Like us, it *prefers* some things and dislikes others. *Physarum* recognizes certain signifiers in its perceptual world (things that are important to it), makes choices and acts according to its desires–seeking out oatmeal and darkness and moisture and avoiding bright light for starters. A recent Royal Society published study[2] has shown *Physarum's* decision-making process is not just a mechanical response but something more nuanced. It turns out slime mold is capable of acting *irrationally*[3]–surely an indication it has something fundamentally more in common with the way we ourselves relate to the world.

But what's so great about irrationality? It seems so inefficient and dumb.

Yet the capacity to be irrational reveals the glimmer of subjectivity, the prospect of an independent relationship with one's environment which, though contingent upon physical and biochemical signals, extends beyond mere mechanistic reactivity into the realm of choices and feelings.

Does the slime mold's perceptual relationship with its environment qualify as consciousness or *mind*? We may never know this absolutely but we are free to perform the thought experiment of imagining what it might be like to exist inside Lord Running Clam's slimy subjectivity. While we're at it, we might also want to challenge our sense of human exceptionalism and ask ourselves: why *wouldn't* a slime mould have consciousness? Why do we so often feel that consciousness in nature is the exception–our special privilege–rather than the rule?

The German bio-semiotician Jakob von Uexküll had a wonderful word for an organism's perceptual world. He called it the *Umwelt*; the German translating literally as the *surrounding world* of a given subject, perceived through its own senses. Von Uexküll imagined what the world might look like from the point of view of a host of creatures—ticks, sea urchins, jackdaws, flies, dogs, chickens—each from within its own Umwelt or sense world. An *Umwelt* is characterized by semiotic triggers, the signals an organism senses and responds to. Sea urchins are sensitive to contrasts between light and dark. A sudden shadow might belie the presence of a predatory fish or an approaching storm. Ticks too, odious as they might seem to those of us who living in fear of Lyme disease, inhabit a sense world signified by body heat and the odor of butyric acid, signals which the mammals on whose blood they feed give off, alerting the tick that a meal might be in the offing. Jackdaws and other social birds pay very close attention to the flight paths of their companions, the trajectories of which can signify impending danger or territorial infringements by rivals.

Plants too have been shown to be aware of their environment, and perhaps more remarkably, they are aware of each other. In the *Hidden Life of Trees*, Peter Wohlleben[4] describes complex subterranean networks that connect tree roots via the intermediary of symbiotic fungi. This results in a vast sentient system under the forest floor, referred to as the *wood wide web,*[5] through which trees share chemical signals as well as redistribute nutrients between (for example) mature trees that are well-nourished, toward saplings that might be struggling to

photosynthesize effectively in the shade of the forest canopy. This kind of 'nursing' behaviour has been documented in Douglas fir *(Pseudotsuga menziesii)* by the Canadian researcher Suzanne Simard[6] and raises some serious questions about long-held forestry paradigms that assume trees are in a constant state of brutal competition with each other for dominance in the forest canopy. How lovely to find out that instead they sometimes help each other out! As their perceptions seem to be networked and mediated by the agencies of their symbiotic fungal companions, it is interesting to speculate if a tree would even have sense of individuality or whether it exists more as a sentient node in a larger assemblage of forest consciousness.

It turns out that we too perceive the world through symbiotic intermediaries. Recent studies indicate human gut microbes substantially affect our moods[7] suggesting the perception of the world we take for granted as our own is at least partially intersubjective. If this is true for us and for trees, it stands to reason that many if not most organisms perceive things intersubjectively, given the prevalence of symbiotic arrangements in living systems, and so the notion of what it is to be an *individual* subject, perceiving the world through *our* senses, becomes more than a little abstract. The American biologist Scott Gilbert summed it up best when he declared: *We are all lichens now*.[8]; lichens being iconic examples of composite, symbiotic organisms that are basically shared platforms or assemblages consisting of fungi, cyanobacteria and algae. As human beings, we share with all other eukaryotes (life forms that have nucleated cells) a common ancestry, which came about when certain ancient bacteria melded with other organisms such as cyanobacteria, eventually subsuming them as organelles[9]. We are, and pretty much always been, composite beings–so we might as well get used to thinking of ourselves in the plural.

A thought experiment is one thing, but Wohlieben's and Simard's work *really does* offer the tantalizing possibility that trees have some form of subjectivity. I am defining subjectivity here as being a *subject* (https://en.wikipedia.org/wiki/Subject_(philosophy)), i.e. capable of having

conscious experiences. Of course I might expect some resistance to such a proposition, as it undermines a deeply-held belief in Western culture that we humans are somehow cognitively exceptional. We are *after all* a species apart. Our obvious self-awareness is reinforced by our highly evolved language skills and our ability to think abstractly; which make it easy for us to position ourselves to one side of what Latour calls 'the nature/culture' divide[10]. But is this self-imposed apartness automatically legitimate?

The often quoted Buddhist philosopher Thich Nhat Han articulates the Zen view that there is "*No separation between self and other and everything is connected*."[11] Given our increasing awareness of how biologically entangled we are with other living things, from the bacteria in our guts, to the corn plants we long ago domesticated that can no longer survive without us, to the rats that eat our garbage, the 'no separation' idea makes a whole lot of sense. As well as our material codependency, what we also have in common with these beings is our shared capacity to have experiences. So if we want to improve our relationships with those many non-human subjects with whom we share the planet, maybe we should pay more attention to how they perceive it. We humans are blessed with a cognitive ability that allows us each to imagine the world from another's point of view, the so-called *theory of mind*. Though eminently useful in maintaining our social cohesion, we could emulate Von Uexküll and use theory of mind to check into the realms of non-human subjectivity more often.

What is the point?

Is this just some crazy mental exercise?

One could argue that neglecting the subjective lives of others hasn't been so great for our species, or for the planet.

Clearly our human exceptionalism has gotten us into all kinds of trouble. Our alienation from other life forms has culminated in a host of catastrophes: mass extinctions, ubiquitous environmental pollution, deforestation, zoonotic

pandemics[12] to name just a few–all of them attributable to our steadfast refusal to transport ourselves mentally into the subjective lives of those other beings we share the earth with, despite our objective awareness that we are interdependent. This disavowal, this rejection of reality, is a kind of collective sickness and its continuance has become antithetical to our own ongoing survival. We all know we need oxygen to breathe, yet how often do we stop to imagine the subjective life of a spruce tree? Would we be as cavalier with our use of agricultural pesticides if we imagined how such a chemical might be experienced from the point of view of a bee?

Sometimes (when it suits us) we are capable of making the effort, as in the well-known case of Temple Grandin, who made a name for herself redesigning slaughterhouses to better address the subjectivities of the cattle being driven along the ramps and chutes on their way to their execution. Grandin's more cow-centric approach resulted in demonstrably lower stress levels to the animals prior to slaughter, which, in addition to being somewhat less cruel, afforded enhanced efficiency[13] to the process, resulting in Grandin's designs being widely adopted by the meat industry. Though clearly a step in the right direction, it could be said that expediting the industrial slaughter of cattle isn't setting the compassion bar particularly high. Yet changing the practices of a vast and profit-driven industry to at least partially address the perspective of the non-humans on which they depend represents a significant departure from our usual way of doing things.

Far too often disavowal is the order of the day. It is far too convenient for us not to have to care, especially if disavowing the subjectivity of the non-human enables us to distance ourselves from the suffering we are causing. *'They're not like us'* we reassure ourselves as we toss another scrabbling lobster into the boiling pot of water. Their screams are not our screams, we tell ourselves because their nervous systems are 'different' from ours.

Yet our disavowal has its consequences and because of it, we miss out on untold opportunities for meaningful exchange.

In *Becoming Intense–Becoming Animal*, Deleuze and Guattari envision an alternate dynamic for relating to the nonhuman, by purposefully setting aside our presumptions and biases of preeminence or evolutionary superiority and deconstructing the artificial hierarchies we so often cling to, in favour of a more fluid *becoming* in which potentialities for alliance can be explored.

Becomings animal are neither dreams or phantasies. They are perfectly real. But which reality is at issue here? For if becoming animal does not consist in playing animal or imitating an animal, it is clear that the human being does not "really" become an animal any more than the animal "really" becomes something else. Becoming produces nothing other than itself. We fall into a false alternative if we say that you either imitate or you are. What is real is becoming itself, the block of becoming, not the supposedly fixed terms through that which becomes passes. Becoming can and should be qualified as becoming-animal even in the absence of term that would be the animal become. The becoming-animal of the human being is real, even if that something other it becomes is not.[14]

So we become through our efforts to become, without having to grow fins or fur or feathers. Yet the opportunity for our inner transformation is clear.

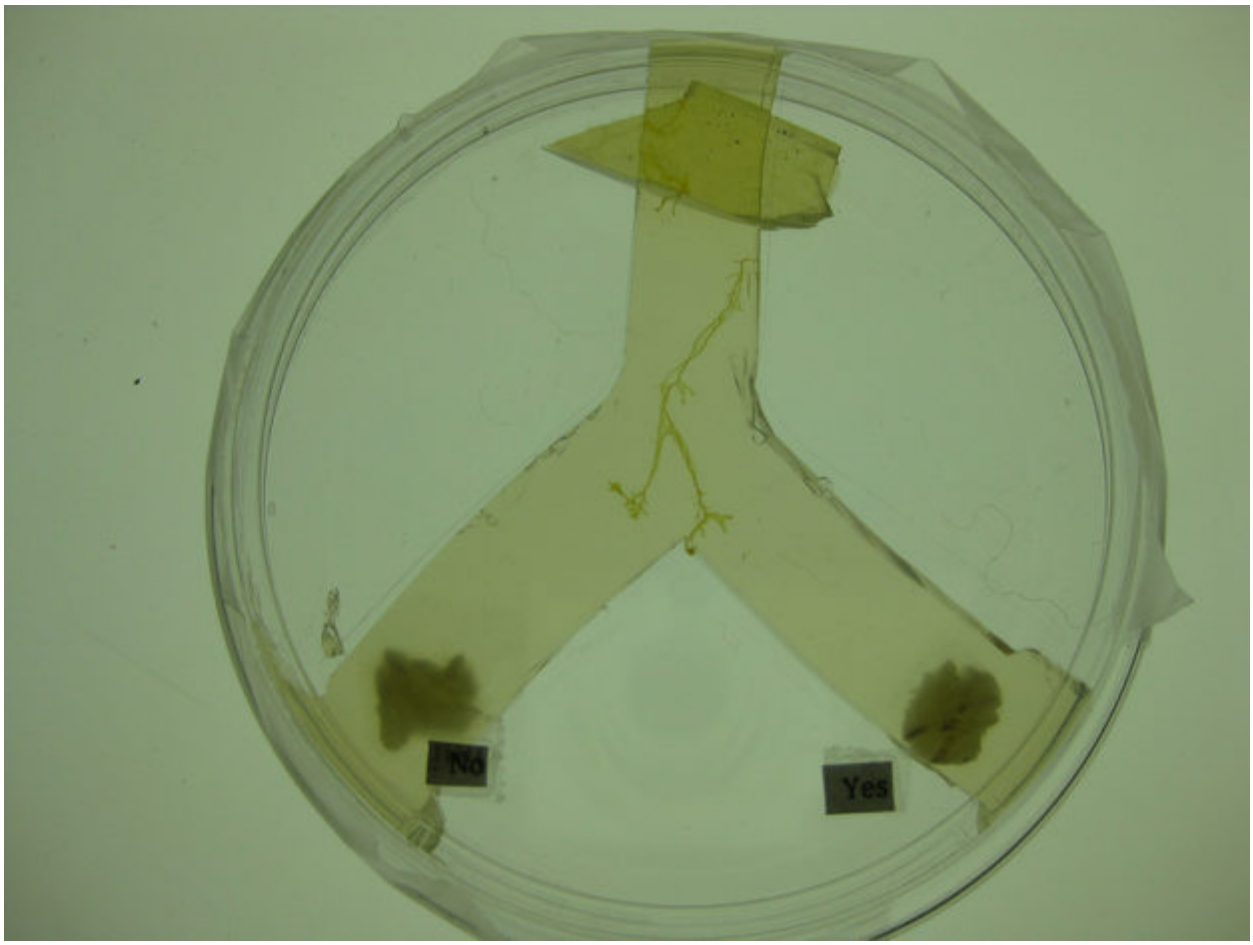
In what they call 'Neoevolutionism' Deleuze and Guattari consider pluralities and assemblages, in which organisms aren't defined by individual characteristics but rather their relational configurations, their swarms and packs, their symbiotic arrangements and the macro-biomes into which they are integrated.
'....a multiplicity, a becoming, a population, a tale...'

And it is also possible for any animal to be treated in the mode of a pack or a swarm; that is our way, fellow sorcerers. [15]

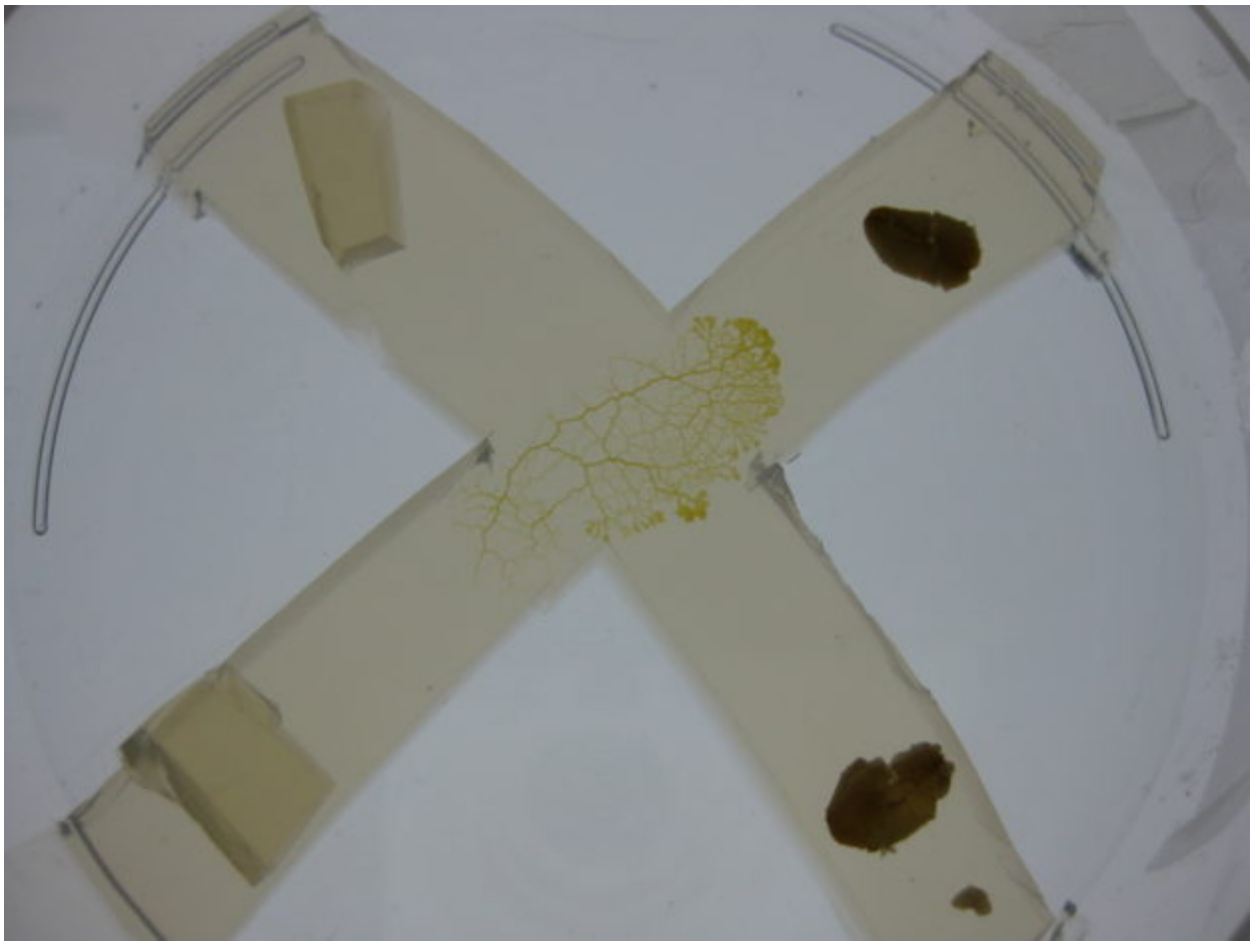
Which brings us back to Lord Running Clam–a 'fellow sorcerer' if ever there was one. To 'become' slime mold, we might first mentally embrace the plural and imagine being in a multiplicity of jostling subjects in constant intimate contact with one another, transmitting what we are feeling to those immediately around

us who then pass them on to others and others again to form the collective consciousness of the supercell. Lord Running Clam *is* a multiplicity, but then again so are *Homo sapiens*. Being the social creatures that we are, human beings have always existed in multiplicities that fundamentally affect our individual sense worlds. Our brains are so geared toward sociality that our perceptions, our thoughts, are constantly mediated by language–a tool we evolved to communicate with each other and upon which we rely even if there is no one else around to talk to. For most of us, mental chatter and internal dialogue quickly seeps in almost as soon as we find ourselves alone. If we aren't in a multiplicity at any given moment, we soon create one in our minds. So like Lord Running Clam – *swarms are us*. Perhaps we just need to be a little more inclusive as to whom we consider consorting with.

Might we open ourselves up more deliberately to non-human subjectivities and incorporate them into our own? Can we imagine opportunities for perceptual hybridity and co-becomings? Many of us already share our lives with pets and companion animals with whom the boundaries of our our *Umwelten* might be quite fluid, as happens when we get a feeling like the intense internalized pleasure of rubbing a cat's forehead and hearing it purr. Our perceptual worlds already do overlap with non-human subjects, when we allow ourselves those rare moments to let down our guard. Maybe there is room for more of this kind of intersubjectivity, or subjective hybridity in the relations we form with other life forms.



Slime mold oracle answering yes or no – or maybe both!



slime mold oracle trending toward an outcome

We might do well to expand our non-human peers beyond those entities typically regarded as pets. I regard Lord Running Clam as a companion of sorts. In fact they help me make decisions from time to time, in a little divination game we play called *slime mold oracle*. To do this, I place a little piece of LRC at the base of a 'Y' shaped agar track and drop an oatmeal flake at the end of each of the letter's two arms; one labelled 'yes', the other 'no.' I ask LRC a question and within a few hours they stream toward one alternative or the other, or in some cases both! A *magic 8 ball* version enhances the fun, allowing LRC to offer a more nuanced set of prognostications and help me sort out some of life's little uncertainties. In this version, LRC is placed in the middle of an agar star with eight points, an oat flake at the end of each with the labels: *'it is certain', 'signs point to yes', 'don't count on it', 'concentrate and ask again'* (and so on...) Of course it is a bit absurd to impart such clairvoyance to a humble amoeboid, but the idea of entangling my life with LRC in this way has a tremendous appeal. It's been at

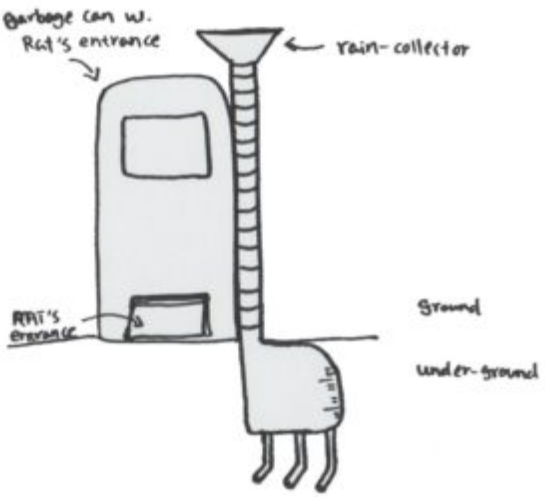
least as helpful to me as reading the horoscope. And it keeps LRC well supplied with oatmeal. Though simply meant as a bit of fun, *slime mold oracle* might point the way toward more serious efforts at functional, ethical intersubjective relations between species. How might we level the playing field between to achieve more equitable power relationships in such an enterprise?

Becoming Non-human/Designing Non-human Role Play exercise at Parsons

Becoming Non-human/Designing Non-human Role Play exercise at Parsons

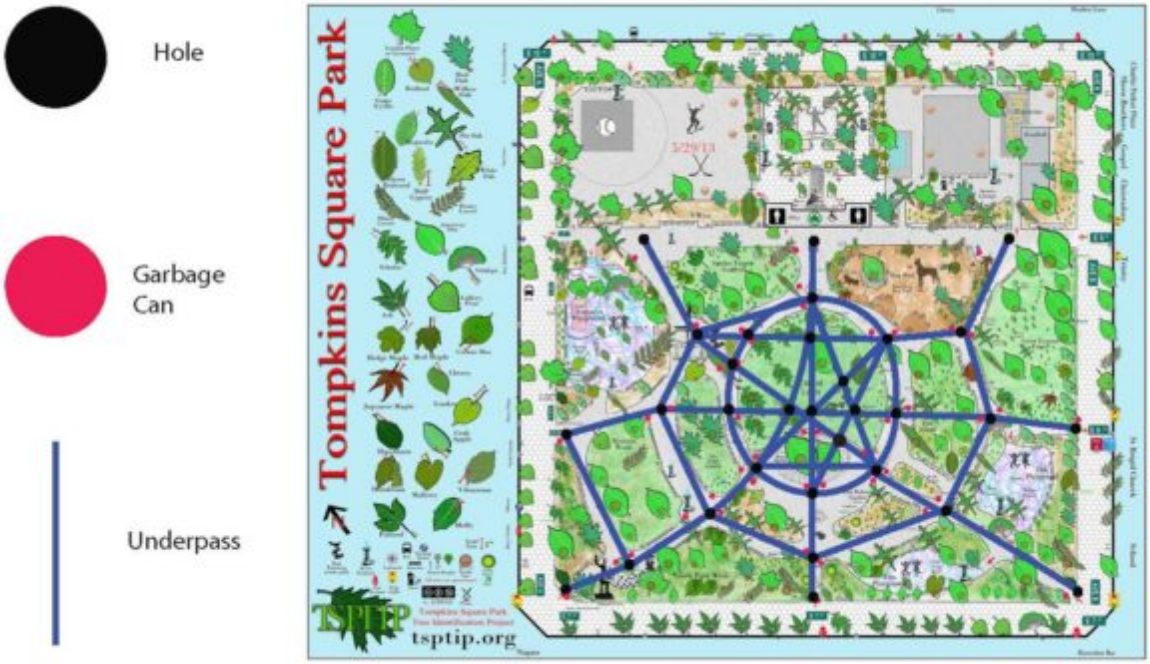
Shifting our frame toward a non-human subjectivity can be a productive practice, despite it being impossible to know if one is even doing it right. For a designer to imagine how another organism perceives its world opens up possibilities for innovation that a more anthropocentric perspective could miss. I assign an exercise to students in my Sustainable Systems class at Parsons called '*Becoming Non-Human/Designing Non-Human*'. The brief is to redesign a New York City park, (usually Tompkins Square or Washington Square), from the point of view of its non-human inhabitants: pigeons, squirrels, rats, worms, bacteria, trees or whatever non-human beings the students feel they can commune with for the sake of the exercise. The non-human becomes their client, on whose behalf the students are working. The challenge of course is that pigeons, rats and trees tend not to turn up in our classrooms with a list of design problems they want solving. To begin to appreciate our client's points-of-view, we head to the park for a protracted observation exercise, *being with* our non-human subjects, as

they go about their daily lives. The students discretely track squirrels, pigeons and sparrows to see how they interact with their *Umwelten*, or perhaps spend time beneath some venerable elm, getting a sense of what it might be like to be rooted in one place as the decades roll by, enduring extremes of weather and gradual climatological shifts, watching old friends slowly succumb to the scourge of Dutch Elm Disease or wood boring beetles, as we short-lived humans scurry back and forth beneath their overarching boughs. The mental turn necessary to attempt to transport oneself into the subjectivity of the non-human client and to design on its behalf has proven to be liberating for my students, as it is a rare opportunity for to create outside the burden of one's own personhood or at least to work within a kind of hybrid state of mind. One student, who expressed a strong aversion to rats, completely rethought Tompkins Square Park to make life much more convenient for her verminish clients, replete with luxurious underground infrastructure and subterranean feeding chutes, to ensure they would never need ascend to the surface to frighten her. Though a proposal to make a New York City park more rat friendly will probably stay (for now) in the realm of speculative design, it clearly took compassion and creative agility for a young designer to take something like this on. Such perspective shift will be increasingly vital in addressing the careening catastrophe that has characterized our species' impact on the planet since at least the Industrial Revolution. By considering the subjective lives of non-human organisms to be as valid as our own, we open ourselves up to a richer, more engaged relationship with the biosphere with the potential to undo some of the damage our pervasive anthropocentrism has inflicted. Such opportunities for reaching out have always been there for us, but now our very survival might depend on them. It's time we make the most of them!



Garbage Can
with
Rat's Entrance
&
Rat's
Drinking Fountain

Student submission for rat feeding station from Sustainable Systems class at Parsons – copyright Huiyang Zhang



Student submission for rat transportation network from Sustainable Systems class at Parsons copyright Huiyang Zhang

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Endnotes

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About Oliver Kellhammer

Oliver Kellhammer is an artist, teacher, activist and writer who focuses primarily on living systems. He divides his time between rural British Columbia where he enjoys communing with slime molds, and New York City where he lectures in Sustainable Systems at Parsons The New School for Design. His web archive can be found at www.oliverk.org View all posts with Oliver Kellhammer → (https://www.interaliamag.org/author/okellhammer/)

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