On *Anima Atman*

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1

In my garden, a grove of banana palms recently had two of its core trunks cut down. The palm leaves weighed heavy on the roof and routinely lurched over into the neighbour's yard. In the days since the cut, the leaves of the remaining palms have started to turn, covering the stumps and exposed chips with restorative shadows. The fig tree, wildly intertwined with the palms, dropped further to cover the ground as we waited for it to heal. Each day I find more evidence, more ways to believe that these trees and plants are not passive, immovable witnesses to minor human drama. Without ever seeing concrete evidence, I find later proof of their being constantly in movement, communicating, the signals of hidden nervous systems evident in slight turns, curls, and reorientation.

2

If I do need any kind of proof, I have endless methods of analysis: I can scan and run leaves through machine learning-driven plant recognition apps, or use meters to read soil, or upload garden progress photos to amateur landscaping threads online. I can measure sunlight and shade and set up cameras. I could craft simulations of this corner of nature – all its qualities I cannot see or sense – through charts, models, lists of measurements. With some of this help, my garden now contains smaller climates, mini- gardens nested inside of it. Once-dead soil is now rich and fertile, full of critters and composting life. Research shows plants learn, usually to avoid pain and sources of damage, to seek light, and to even 'move' or lean away from poor environments. Developing it, I remained inspired by my mentor's garden on the upper arm of New England. Plants that would never have found themselves near one another thrived in adjacent microclimates separated by stone. Outdoor plants were first seeded and grown indoors, with the right conditions simulated. Outside, planted in a spiral around a hill, seeds of plants from Nepal grew alongside rare cycads, ginkgo trees, wildflowers from travels around the world.

3

Our understanding of nature evolves with access to biological scales of movement imperceptible to the naked eye, made perceivable through a vast spectrum of synthetic media. Our perception co-evolves with artificial analysis, the tools we use as prosthetic sensors. And the environment changes with our increased mediation, in part because we are more able to see ourselves *in relation to* nature, orienting ourselves as systems working alongside and within other complex systems and ecologies.

Troika's *Anima Atman* (2024) models precisely this complex interdependence between technological mediation as a system, plant life as system, and human perception as system. Through the right lens, and careful orchestration, we can see three ongoing cycles that overlap and feed one another. Purple thistles emerge from a silica bed, a picture of natural and organic materials (and movement) alongside synthetic materials, and movement, highly intricate and orchestrated. The work's composition suggests both the *anima* (soul, breath, from the Latin) that exists in plant life, and something like the *atman*, an essence existing in and of itself (from the Sanskrit). As a viewer, we're encouraged to see everyday elements in a new architecture, a hybridisation of elements we can't be sure would even be possible in the natural world.

The trio of artists use thistles, which can grow anywhere – ruins, natural disasters, abandoned lots, by the sea, in harsh rocky land – or in some cases, on simulated rocky silicon ground in a blacked-out gallery. Light fixtures above pulse at a speed that can't be tracked by the human eye. The pulsing is rhythmic and timed by the artists to sync with a hidden device that moves the thistles. The thistles seem to dance. One is reminded of time lapsed films that accelerate the life to death cycle, or the growth process, but on a loop – closing, opening, closing, or rising and falling. On a second or third watch, they look almost generated, moving as though animated, choreographed, with wires causing an almost sinister set of self-contained, tidy movements. Watching plants move in unusual ways that suggest a live-ness immediately, profoundly changes our relationship of both viewing and understanding aliveness in them. To see a plant move, and not *be* moved, behaving in reaction to an environment, moves their status away from objects and passive resources, Troika argues.

In their odd, erratic, almost cyclical movements, the thistles seem to model expanded cognition, giving a sense of intelligence beyond a concentrated neuronal network. The plant movements we normally could not see, the product of a distributed intelligence held in leaves, stems, and roots, are here made sensible and imaginable. We need the artifice of the movement, the shaking of the leaves, to catch the essence, the driving movement – the plants' intelligence. Their spirit or *anima* just works at a different scale and speed, helping the plant predict, adapt, and grow in the way that best suits their survival.

4

The dance of thistles might very well continue right on past us. The thistle is incredibly difficult to control: hardy, resistant, and a swift displacer of native plants. Thistles are found more likely to survive in extreme heat experiments, making them one of many weeds that 'outperform' other plants. We can imagine they'll turn from undesirable alien plants, pesky invaders, into admirable survivors. In the decades to come, they might be the post-apocalyptic climate survival poster plant, fit for almost any imaginable wasteland. Given the limits of our own knowledge of the full future impact of the climate crisis, we may increasingly need to pay attention to the reactions of non–human life, of plant life, and consider the role they will play alongside us in survival.

Here we might also consider a future of hybrid plant-machines. A recent viral video announced mushrooms are now being fitted with small robots. Long before today, plant-robot hybrids came about from the mind of pioneering biologist-engineers like Barbara Mazzolai. She was inspired by roots, and the precise way they distill critical information, guiding their plants away from salt and towards nutrients, with exceptional efficiency. Biohybrid robotics then created by a Florence University (IT) and Cornell University team presented the world with part fungi part robots learning to crawl and navigate environments, modelling how living systems respond to heat, signals, light, electricity, responding mechanically, communicating through signals, emitting chemicals when damaged.

Plant life has evolved to include spikes, or calcified stems, and in some cases, colouring – even black pigmentation – to find a way to survive a future where frequent heat waves, excessive sunlight, and naked UV rays are the norm. As plant intelligence is increasingly understood, we have a better understanding of how plants evolve and survive in hostile environments, in places they are not native to – whether invading, brought through trade, intentionally or by accident – thriving where they were not ever intended to be. More and more, plants thrive where they were never intended to survive at all.

This field of 'cyborg botany' makes for an evocative future of cybernetic plant forms in the ruins, with the electric signals of plants tied into sensitive robotic prostheses, perhaps sent out to find liveable environments for us when we humans might be too weak and exposed to explore. I can imagine the black plants, having evolved precisely to survive climate flux, sent out to test the toxicity of a landscape, not stopping until some kind of liveable land is found. Using their natural electronic circuit systems, they'd test the soil, find changes in gravity and heat, and communicate with their bio-electro-mechanical signals to their plant organs and tissues. We'd take in their growth and absorption of moisture, their respiration, the changes in temperature, their wounding.

As *Anima Atman* also makes sensible, climate change is in large part accelerated by a logic of extraction that makes forced labor for cobalt, copper, and silicon in Brazil, China, and Malaysia somehow necessary. As climate change increasingly creates social instability and crisis at unprecedented scale, using machine vision, sensors, and other forms of machinic intervention will aid human engineering (or healing) of the environment. At the edge of the physical interface and the virtual, we find simulations, made by computer models, that construct the future. With more sense data – say, capturing the movement of thistles across an artificial landscape or an abandoned wasteland – we might find the boundaries for organic life, trying to find a way to live just as we will be.

5

Using scientific methods and data analysis, we can materialise aspects of living for each element in this nonhuman world. We find a desperate necessity for new narratives in which human intervention is not the sole purpose of

designing the natural world – but instead, an overstory of the confluence of plant, human, natural, and synthetic worlds all co-evolving.

As we find our place somewhere along the stretch from plant intelligence, to animal, to machine intelligence, we are forced to consider alliances with other living systems. Fuelled by the intelligence 'explosion', our understanding of what constitutes intelligence has necessarily expanded. Knowing more about the inner lives of plants helps us integrate conceptions of interspecies communication and interdependence into our ideas of the world, and consider, even, the behaviours and actions of entities that we just know we can't see. The frequencies we can't hear, the movement we can't perceive: unheard rhythms gauged through human-machine environmental sensing.

In future waste sites and waste lands, life will bloom again in the scars left behind by human production. In post-industrial cities across the world, wilding easily overtakes empty lots and abandoned properties, mills and plants long shut down, a mix of native and those hardy invasive species. Whether fully independent in their consciousness or deeply interdependent with other plant and animal life, we can expect that thistles are driven as much by their *life force* as we are. As we have evolved our technologies, which have evolved us, we have also expanded our framework, understanding that the fitness of plants means our own fitness, and the fitness of the natural world means our potential to live on. We can use augmentation, in this hopeful future, to become more fit for the macro- and micro-climates we'll encounter.