

Vegetal Scale in the Anthropocene: The Dark Green

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Abstract

When exploring the problem of delineating possible “scales” useful to describe the Anthropocene’s ecological changes, I suggest plant-human relations as the basis of our models rather than solely Human impact with a capital “H” as if a stand-alone species. Instead, human beings are a species within the photosynthesis-shaped, oxygen-infused atmosphere, and countering the ongoing industrial ecocide means seeking multispecies justice. One may claim that the “vegetal” stands as the ontological antithesis of being “animal,” but that view expresses a one-dimensional disregard for the essential work and bodies of plants and their fellow photosynthesizers that produce oxygen, drive the carbon cycle, feed terrestrial life, and influence water cycles. Indeed, “animal” is an emergence from the vegetal context. But our plant stories are shifting with the anthropocenic inflection. This dark green project explores narratives, both scientific and creative, of plant-human interactions in time of planetary change; and these interactions are not always peaceful or on an easily comprehended scale. As an example, I consider the 2015 short science-fiction story from Alan Dean Foster, “That Creeping Sensation,” that portrays how plant-human relations take on frightening new forms in a climate-changed world altered by heat, carbon dioxide, and the not-always-supportive activities of plants. With all the heat and carbon dioxide, plant life explodes and produces a massive increase in oxygen. In response, insects grow enormous and specialized first-responders must battle the bugs. Foster’s texts portray scales of non-human agency larger than the human whose power encompasses, enables, and sometimes threatens human life. His “cli fi” tale of giant bugs presents human beings as inextricably enmeshed in a plant-dominated existence. To paraphrase Derrida, there is no outside the vegetal.

Keywords: Plant studies, Goethe, science fiction, Anthropocene, scale.

Resumen

Al explorar el problema de delinear posibles "escalas" útiles para describir los cambios ecológicos del Antropoceno, sugiero utilizar las relaciones entre plantas y humanos como base de nuestros modelos en lugar de usar únicamente el impacto Humano, con una "H" mayúscula, como si fuera una especie independiente. En cambio, los seres humanos son una especie dentro de una atmósfera imbuida de oxígeno y determinada por la fotosíntesis, y contrarrestar el ecocidio industrial en curso significa buscar una justicia multispecies. Se podría argumentar que lo "vegetal" se erige como la antítesis ontológica de ser "animal", pero esa visión expresa un desprecio unidimensional por el trabajo esencial de las plantas y sus compañeros fotosintéticos que producen oxígeno, impulsan el ciclo del carbono, alimentan la vida terrestre e influyen en los ciclos del agua. De hecho, "animal" emerge del contexto vegetal. Pero nuestras historias de plantas están cambiando con la inflexión antropocénica. Este proyecto verde oscuro explora narrativas, tanto científicas como creativas, de interacciones planta-humano en tiempos de cambio planetario; y estas interacciones no siempre son pacíficas o en una escala fácilmente comprensible. Como ejemplo, considero la breve historia de ciencia ficción de 2015 de Alan Dean Foster, "That Creeping Sensation", que describe cómo las relaciones entre plantas y humanos adquieren nuevas formas aterradoras en un mundo con cambio climático, alterado por el calor, el dióxido de carbono y las actividades no siempre beneficiosas de las plantas. Con el calor y el dióxido de carbono, la vida vegetal se dispara y produce un aumento masivo de oxígeno. En respuesta, los insectos se vuelven enormes y los servicios de emergencia especializados deben luchar contra los insectos. Los textos de Foster retratan escalas de agencia no humana superiores a la humana cuyo poder abarca, habilita y a veces amenaza la vida humana. Su historia "cli fi" de insectos

gigantes presenta a los seres humanos como inextricablemente enredados en una existencia dominada por las plantas. Parafraseando a Derrida, no hay un afuera de lo vegetal.

Palabras clave: Estudios de plantas, Goethe, ciencia ficción, Antropoceno, escala.

Twenty-three thousand breaths a day is the human average: our bodies continuously interface with the swirling gasses all around that sustain us like ocean water supports marine life. Oxygen-rich air is our medium, the only one in which we can survive, and it is one that has developed from the photosynthetic activities of plants, cyanobacteria, and phytoplankton. To say that we depend on plants is to understate the case: they produce breathable air with just the right amount of oxygen for our needs as well as food in the form of plants themselves and the animals who eat them, but also livable local—and global—environmental conditions. If Val Plumwood describes “the body, ecology and non-human nature” as our “enabling conditions” (Plumwood 17), I suggest that we add plants specifically to that list. As Johann Wolfgang Goethe states in his scientific writings, the vast landscape of green life is a “plant-ocean” which is essential for insects, etc., as are the world’s oceans for fish (Goethe 1987, 214, my translation); and we, too, he notes elsewhere, “are citizens of the “Luftmeer” or “air-ocean” produced by vegetation (Goethe, “Physikalische Vorträge” 165; my translation). Thinking of the plant world and its oxygen-rich atmosphere as an ocean gives contours to our aery, photosynthesis-supported surroundings that industrial humans rarely register other than as mere backdrop. Additionally, our modern industrial petro-cultures primarily burn rotted plants (that is, “fossil fuels”) for our energy needs.¹ We are reliant on a full range of plant contributions, as Luce Irigaray also notes in her co-authored text with Michael Marder, *Through Vegetal Being*. She writes that she became a citizen of the world enabled by plants with her first breath at birth, and thus: “Perhaps, the first gesture of recognition, but also of gratitude, regarding our vital dependence on air would be to care about the vegetal world” (Irigaray 30). The plants’ chloroplasts produce sugars from carbon dioxide, sunlight, and water, and then release the oxygen that we utilize in our bodies with the exact reverse chemical process. We are, in short, immersed in ongoing exchanges with plants at all times and we evolved specifically *in response to plant lives and activities*. Besides our bodily needs, human *cultures* more broadly take various forms based on the particular strategies they engage in the plant-human interactions such as agri-culture and the burning of wood, coal, or oil. Hence, my proposal for the environmental challenge of finding a relatable and useful scale to describe such complex issues as global climate change and the sixth extinction event on Earth is to formulate the scale based on plant-human relations.²

While the green of this essay’s title, the “dark green,” refers to the vast array of plant life and their photosynthesizing cousins, the algae and phytoplankton, that is, the

¹ On petrocultures and plants, see Sullivan.

² Regarding the sixth extinction, see Kolbert.

mostly overlooked and yet extremely powerful vegetal force that “enables” our bodily existence, the “dark” acknowledges that we are in the Anthropocene. This geological era is marked by ever more burning forests, forest death (*Waldsterben*), industrial agriculture covering most of the planet’s arable land with monocultures fed by fossil-fuel produced fertilizers, climate change, widespread radioactivity and pollution putting not only animal life but many plants at risk for extinction, and, last but not least, the devastating takeover by invasive species such as kudzu vines and pigweed. Our plant stories are shifting with the anthropocenic inflection. This dark green project explores narratives, both scientific and creative, of plant-human interactions in time of planetary change; and these interactions are not always peaceful or on an easily comprehended scale. As an example, I consider here the 2015 short science-fiction story from Alan Dean Foster, “That Creeping Sensation,” that portrays how plant-human relations take on frightening new forms in a climate-changed world altered by heat, carbon dioxide, and the not-always-supportive activities of plants. Plants have figured out, evolutionarily speaking, how to use a vast array of species to help pollinate and spread their seeds and to eradicate their competitors. I explore therefore both the life-enabling (albeit rather manipulative) activities of plants as well as their own agentic developments that may threaten human lives.³ In terms of plant-human collaboration, I look to Robin Wall Kimmerer’s 2013 book, *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teaching of Plants*. While Kimmerer demonstrates that humans and many modern plants thrive best in collaborations, Foster’s story depicts a world less amenable to human survival when the high levels of carbon dioxide enable explosive plant growth with challenging results. This essay considers narratives about how we exist within, and as part of, the plant world’s “air-ocean,” or, to coin a term, the global, photosynthesizing, water-driven, and gas-exchanging “florosphere.”

When exploring the problem of delineating possible “scales” useful to describe the florosphere as it changes with anthropogenic destruction, I suggest plant-human relations as the basis of our models rather than solely Human impact with a capital “H” as if a stand-alone species. Instead, human beings are a species within the florosphere, and countering the ongoing industrial ecocide means seeking multispecies justice. One may claim that the “vegetal” stands as the ontological antithesis of being “animal,” but that view expresses a one-dimensional disregard for the essential work and bodies of plants and their fellow photosynthesizers that produce oxygen, drive the carbon cycle, and influence water cycles. Indeed, “animal” is an emergence from the vegetal context. That so many of our most ancient origin stories and religious texts begin with gardens and trees resonates here; as does the fact that numerous more recent stories from the Anthropocene about environmental degradation beginning in the nineteen-fifties reveal obsessive tales speculating about evil plants at the very moment of the “green revolution’s” development of industrial agriculture dependent on fossil fuels for fertilizer, pesticides, herbicides, and

³ On the manipulative powers of plants, see Michael Pollan’s *Botany of Desire* and, even better, his audiobook, *Caffeine*.

the running of massive-scale farms.⁴ Human cultures are strongly influenced by the shape of their plant relationships, as Lincoln Taiz and Lee Taiz demonstrate in their broad survey of plant-related texts and artifacts beginning with Neolithic examples and ending with contemporary plant science, *Flora Unveiled: The Discovery and Denial of Sex in Plants*. Though plant-human relations shape both sacred and mundane narratives, and though we cannot live without plants (despite some science-fiction fantasies about life in space), plants and the vegetal scales certainly exist beyond the human. That is, plant life is simultaneously bigger (about eighty percent of Earth's biomass is vegetal) and older (photosynthesis began around 3.4 billion years ago). Matthew Hall writes in *Plants as Persons: A Philosophical Botany*: "Most places on Earth which contain life are visibly *plantscapes* [...] In fact, the bulk of the visible biomass on this planet is comprised of plants. It is a fact that in most habitable places on Earth, being in the natural world first and foremost involves being amongst plants, not amongst animals, fungi, or bacteria" (Hall loc. 42-6). We are, to quote Kimmerer, the "younger brothers" of the vegetal: "In the Western tradition there is a recognized hierarchy of beings, with, of course, the human being on top—the pinnacle of evolution, the darling of Creation—and the plants at the bottom. But in Native ways of knowing, human people are often referred to as the 'younger brothers of Creation'" (Kimmerer 9). Similarly, the editors of *The Language of Plants: Science, Philosophy, Literature*, Monica Gagliano, John C. Ryan and Patricia Viera note:

Plants are perhaps the most fundamental form of life, providing sustenance, and thus enabling the existence of all animals, including us humans. Their evolutionary transition from Paleozoic aquatic beginnings to a vegetative life out of water is undoubtedly one of the farthest-reaching events in the history of the earth. It was the silent yet relentless colonization of terrestrial environments by the earliest land plants that transformed the global landscape and radically altered the geochemical cycles of the planet. This resulted in lowered concentrations of atmospheric carbon dioxide and thus set the scene for the emergence of terrestrial animals about 350 million years ago. (Gagliano et al. vii)

Plant life has a much longer history than we human beings do; hence we can speak of plants without human beings but never of human beings without plants. Human history is, in fact, enabled by and contained within the florosphere, and our scales exist in relation to its vegetal power.

Like all life systems, the florosphere evolves over time yet it is changing much more rapidly in the Anthropocene. Many plant species are going extinct due to human activities and climate change (Josef Reichholf estimates that up to seventy percent are now at risk of extinction). Yet, on the other hand, we see the technologically flourishing plants of industrial agriculture fueled by petroleum products, the strangely healthy radioactive plants near Chernobyl,⁵ and various invasive species conquering vast areas (like kudzu

⁴ The vast array of religious narratives delineating sacred gardens like Eden or sacred trees like the old Norse Yggdrasil, Celtic trees, and the Bodhi tree in India is addressed in the Taiz book, *Flora Unveiled* and in Diana Beresford-Kroeger's *To Speak for the Trees*. For plant horror narratives after the "green revolution," see *Plant Horror*, by Dawn Keetley and Angela Tenga.

⁵ On the relatively healthy plants surviving near Chernobyl, see Georgieva et al.

and poison-resistant pigweed).⁶ Perhaps most importantly for this essay, plants frame natural history and our history. Plant-human scale disorients since it removes human beings from their seemingly solitary and dominant narrative position.

Foster's 2015 short story from an anthology of climate-change stories, "That Creeping Sensation," emphasizes the dependent situation of human beings within the aery florosphere. The tale features Sergeant Lissa-Marie, a new kind of first responder in a climate-changed world. She is a military specialist who swoops in during emergencies with her partner, Corporal Gustafson, to remove the dangerously massive insects now thriving in a high-oxygen atmosphere. While 2020 levels of oxygen are, as they long have been, around twenty-one percent, Foster's world has forty-one percent oxygen due to accelerating plant growth in a warming world. Their first emergency call of the day is to remove six-inch long bees from a house while avoiding the foot-long yellow jackets with massive stingers. During the bee-battle, Lissa-Marie thinks back to how they ended up with such overwhelming insects. This moment provides a typical science-fiction "info-dump" describing how everyone was worrying about the increasing levels of carbon dioxide but failed to heed the explosive thriving of plants:

With the increased heat and humidity, plant life had gone berserk. Rainforests like those of the Amazon and Congo that had once been under threat expanded outward. Loggers intent on cutting down the big, old trees, paid no attention to the fecund explosions of ferns, cycads, and soft-bodied plants that flourished in their wake. A serious problem in temperate times, vines and creepers like the ubiquitous kudzu experienced rates of growth approaching the exponential. (Foster, "Creeping" 233)

In addition to all the wild and ancient forms of plants like ferns and cycads and the uncontrollable expansion of kudzu vines, the amount of oxygen in the air increased rapidly, too, which allowed for the return of vast insects similar to those which lived in the Carboniferous era.

The great sucking sound which resulted was that of new vegetation taking carbon dioxide out of the atmosphere and dumping oxygen in its wake. Their size restricted for eons by the inability of their primitive respiratory systems to extract enough oxygen from the atmosphere, arthropods responded to the new oxy-rich air by growing to sizes not seen since similar conditions existed more than 300 million years ago. (Foster, "Creeping" 233)

Foster here reveals the interconnected lives of humans, plants, and insects, and the relevance of tracking plant life in terms of oxygen levels. In "That Creeping Sensation," the overwhelming amount of oxygen makes it essential for human beings to wear masks whenever they are outside in order to limit their intake of the extreme levels of oxygen that have made fire hazards the most dangerous disasters of all. Furthermore, the story exposes a blindness towards the full array of vegetal lives such that the communities fail to anticipate either the rapid plant growth in the changing conditions or the concomitant increase in insect size. The shifting scale of plant-human (and plant-insect) relations is exactly what is at stake in this short tale of heroic and rather cheesy battles against giant bugs. Foster's young-adult novels frequently combine pop-culture action with intensely ecological visions emphasizing plant-human relations. In particular, his novels *Midworld*

⁶ For discussions of plant death and plant expansion in the Anthropocene in the US and Germany, see Grebenstein and Reichholf respectively.

from 1975 and *Mid-Flinx* from 1995, in which the action takes place on the same forest-dominated planet, feature intelligent and interconnected “home trees” within which human colonists live and without which they have no chance for survival. *Midworld* is considered to have been a major influence on James Cameron’s 2009 blockbuster film, *Avatar*. Appropriately, the German translation of *Midworld* is titled *Die denkenden Wälder* (*The Thinking Forests*).

In “That Creeping Sensation,” Sergeant Lissa-Marie and Corporal Gustafson finish with the bees and then receive a “42B” call, which Gustafson thinks is “Boy stepping on Scorpion,” but Lissa points out: “That’s 42A. 42B is scorpion stepping on boy” (Foster, “Creeping” 234). They are easily able to trap and kill the yard-long arthropod but immediately are called to one of the most dangerous encounters of all, a code two red: this turns out to be a jumping chilopod, a six-foot centipede hiding in someone’s basement. They arrive in the final battle of the story, cautiously entering the basement. The centipede suddenly “burst out from its hiding place to leap straight at her startled companion. Its modern Amazonian ancestors had jumped into the air and fed on bats. This oxygen-charged contemporary monster had no difficulty getting high enough off the ground to go straight for Gustafson’s throat” (237). Luckily, Sergeant Lissa-Marie has experience with these wild jumpers and is able to save her younger partner and stop its claws from wrapping around his neck. The two bug-battling soldiers live to fight another day against the over-oxygenated insects in their fire-dangerous, climate-changed world. It is clear that the human-bug war is not only a losing battle but also one in which human beings are not the primary shapers. Immersed in the florosphere, they must breathe the air despite its excesses: “Lisa inhaled deeply of the thick, moist air. It filled her lungs, the oxygen boost reinvigorating her after the confrontation in the basement. Drink of it too much and she would start feeling giddy” (238). But even more than the overly rich air and the still-increasing size of the insects, Lissa-Marie and Gustafson worry about the ants. “All ants. Not because they were prolific and not because they could bite and sting, but because they cooperated. Cooperation could lead to bigger problems than any sting. In terms of sheer numbers, the ants had always been the most successful species on the planet. Let them acquire a little of the always-paranoid Gustafson’s hypothetical intelligence to go with their new size and...” (238). Foster here again imagines a larger intelligence beyond the human, as he does in his *Midworld* novels, in which the vegetation creates a world guided by its massive, interconnected brain that can reach out into space as if with quantum entanglement in order to influence larger, cosmic events. Foster’s texts portray scales of non-human agency larger than the human, whose power encompasses, enables, and sometimes threatens human life. His “cli fi” tale of giant bugs presents human beings as inextricably enmeshed in a plant-dominated existence. To paraphrase Derrida, there is no outside the vegetal.

In contrast to Foster’s portrayal of human immersion in the florosphere as our only possible status, other plant-relevant science fiction tales feature dystopian visions of the return of the botanical as a new phase that will destroy human culture. In these stories, plant-human relations embody not our standard existence but rather a form of human regression “back” into a “primitive or “primeval” status. For example, the two novels from

1962, Brian Aldiss's *Hothouse* and J. G. Ballard's *The Drowned World*, both depict global warming transforming most of Earth (back) into an expanding jungle. Like Joseph Conrad's *Heart of Darkness* that aims to critique imperialism yet does so with a famously racist vision of the "primeval" world and people of the Congo, these novels portray plant worlds as both the ancient origins and future end of culture.⁷ When trees dominate in these texts, modern human beings fail and "civilization" fades away in the murky vegetation. In *Forests: The Shadow of Civilization*, Robert Pogue Harrison explains that European cultures presented deforestation as the necessary path towards progress.

In contrast, the Swiss satirist, Franz Hohler, presents a humorous view critical of human hubris and plant-human relations in his short story, "The Recapture" ["Die Rückeroberung"], which details the reappearance of wildlife in the city of Zurich. The citizens are at first delighted and then shocked as bears, too, re-take the city. They find ways to adapt to their new neighbors, even when the wolves start hunting. But when massive plants sprout, it is too much for adaptation. The final "threat came from plants, especially from two varieties. The first was ivy that suddenly started growing incredibly fast. During a single night it could grow from a garden to the middle of the road, and if it was cut in the morning it was already at the edge of the sidewalks by the evening" (Hohler loc. 751-57). The other plant was from the swamps: it grew tall enough to cover entire cars in a day. Hohler's tale, like Foster's, presents the violent human responses as folly with an ironic vision of vegetal power that easily overcomes aggressive and misguided cultural systems ignorant of their enabling conditions.

It is of great concern that large-scale and interconnected vegetal lives frequently appear to represent the "opposite" of human culture, despite being the basis upon which human cultures and lives depend. The scales of human lives and civilizations are contained within this interconnected, multispecies system, which is changing in the Anthropocene's dark green. Hence, we need more imaginings of the plant-human relations within the florosphere's breathable air, like Foster's, that reveal the force of the vegetal as both life-enabling and potentially threatening with the new circumstances shaped by industrialized practices and waste. The first step is to recognize plant life as our green basis and framing scale of existence; the second is to find ways to seek multi-species justice with plants and their co-species (including humans) in mind.

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⁷ See Chinua Achebe's famous critique of Conrad.

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