REGENERATION:
Environment, Art, Culture

Googasian, Victoria. "Infrastructural Character: Space Opera's Energy Imaginary." *Regeneration: Environment, Art, Culture* 1, no. 3 (2025): pp. 1–21.
DOI: https://doi.org/10.16995/regeneration.16555

Open Library of Humanities

Infrastructural Character: Space Opera's Energy Imaginary

Victoria Googasian, Georgetown University in Qatar, QA, vg261@georgetown.edu

This article is occasioned by popular media's resurgent interest in the space opera, a genre that depends on imagined energy infrastructure for its very conditions of possibility. On the surface, space opera might not seem well-suited to narrating energy transitions. It is, from one vantage, the genre par excellance of infrastructural inertia, whose vision of human civilization underwritten by vast energy reserves has survived the many energy anxieties of the twentieth and twenty-first centuries. But precisely because the genre seems so firmly grounded in an obsolete energy imaginary, space opera warrants critical attention to the ways narrative encourages or impedes our ability to conceive new forms of energetic life. Viewed this way, I argue, space opera teaches us to read against the grain of the dominant story of technocratic triumph, to discover variant structures of feeling lurking beneath the shiny tale of managerial heroism and nostalgic desire. As I show, popular space operas from the late 1960s onward offer us important narrative resources for responding within and against the dominant politics of affect with which our own political leaders often approach energy transition. In these fictional worlds, technocrat heroes might wield powerful affect-laden tools of persuasion, advocating their energy transition agenda by celebrating energetic independence, and reveling in the transcendence of embodied constraint that science fictional technology purports to grant them. But because they are doubled by the much more marginal figure of the energy worker, these characters are also caught up in minor, emergent affective potentialities. Such narratives thus encode alternate patterns of affective response that exceed and, in some ways, undo the genre's surface celebration of freedom from material dependency, empowerment over one's environment, and the mania that ensures the perpetuation of extractivism.

The genre of the space opera has enjoyed an evergreen popularity in U.S. popular culture—and it is arguably in the midst of yet another renaissance. Film studios and streaming services have released a recent profusion of interstellar epics: Villeneuve's *Dune,* Apple-TV's *Foundation*, and new iterations of the *Star Trek* and *Star Wars* franchises. That such narrative forms should remain popular in an age of increasing anxiety about the end of cheap, abundant energy requires some explanation. In Alastair Reynolds's helpful definition, space opera is defined by travel between worlds, facilitated by technological means—and therefore dependent on energy surplus to power both its plot and its space ships.[1] As a result, space operas offer fantasies of unfettered spatial freedom and infinite imperial expansion, and their worldbuilding depends on imagined energy infrastructure for its very conditions of possibility. For those reasons, the genre seems poorly suited to the survival demands of our time: the dire need to imagine and bring about a transition away from reliance on fossil fuels. Space opera represents, from one vantage, the genre *par excellence* of infrastructural inertia, whose vision of human civilization underwritten by abundant energy has survived the many energy insecurities of life in twentieth and twenty-first century America, offering star-spanning colonial extractivism as the guarantor of endless growth. But as Graeme Macdonald has argued, "even the very *irresponsibility* of the space opera vision of energy excess can offer a platform to question the sustainability—and achievability—of such future forms and systems."[2] Precisely because the genre seems so firmly grounded in an unworkable yet resilient energy imaginary, space opera warrants critical attention to the ways its narratives encourage or impede our ability to conceive new forms of energetic life.

To this point, attitudes toward space opera and related science fictions have varied considerably across the energy humanities. Writing in a well-cited *PMLA* column on energy forms and literary periodization, Imre Szeman argues that science fictional accounts of energy futurity provide limited utility to those who seek to promote equitable decarbonization. Szeman points out that such works fall into two broad affective categories, targeted to elicit either techno-optimistic commitment to a future of superabundant energy or, in their dystopian mode, petro-nostalgic visions of energy scarcity. If these genres have any value, he contends, it comes in their making visible the untenability of our "political fantasies."[3] The work of the critic, then, would be to uncover and highlight the baselessness of the assumptions that undergird both modes of futurity. But not all scholars of the genre agree that its value emerges only in the negative. For Bradon Smith, for example, the energy futures of science fiction provide a value that Szeman downplays, merely because they break the cultural hegemony of petromodernity and remind us that energy systems have always been subject to change, and will inevitably remain in flux.[4] To put it another way, as visions of energy futurity,

space operas remain committed to the premise that we have not yet reached the end of energy history.

Indeed, in the space operas I will consider in this article, energy transition forms both a highly pertinent a historical context and a future horizon of ongoing political activity. In spite of their high-energy commitments, space operas *do*, in fact, tell the story of energy transition with surprising frequency. Moreover, while that story is often partially occluded by a nostalgia for the fantastic past of energetic freedom, the scale and complexity of the genre makes space for perspectives less committed to the extractive order. The golden era of U.S. space opera, after all, coincided with the post-war period of apparent energy abundance. But the space opera came of age as this relative energy assurance dissipated for good in the late 1960s and 1970s. By this point, the genre often cultivated an ambivalent temporal relation toward energy transition. While some characters anticipate the advent of radically new energy relations, for others, transition marks the possibility of recovering and resecuring the untroubled relationship to energy freedom that seems to be slipping away. Often these divergent attitudes occur within the same text.

The examples of the genre I will consider in this article represent late-60s classics—Frank Herbert's first two *Dune* novels and Samuel Delaney's *Nova*—whose plots manage such contradictory affects. Both texts feature characters with epic plans to incite a revolution in the extractive order that ensures humanity's intergalactic colonization project. But though both also take place in distant futures of unquestionable energy abundance, these novels do not take for granted the progressive assumption that future changes to the energy system will lead to improved lives and political possibilities. In effect, these texts subtly undermine the powerful cultural logic that the Petrocultures Research Group (PRG) has termed "Transition Without Loss"—they eschew the belief that changing the technologies and conditions of energy production will ensure continued access to the privileges of modernity that cheap energy guarantees.[5]

This complication of a common, comforting myth about energy transition is all the more powerful because space operas so often center the very figures of technocratic expertise who are most committed to the Transition Without Loss story. As the PRG points out in its first *After Oil* report, this transition story places supreme trust in technocratic expertise.[6] Thus, the hero of the space opera energy transition is often the managerial figure who literally engineers a new material and social infrastructure. But as I will argue, even at the height of their techno-optimistic fantasies, space operas repeatedly recognize that transition names a multidimensional process, involving not only new technologies and new energy sources, but also changed social relations and new structures of feeling. The space opera can capture these multiple valances of

transition because of the genre's liminal position within the broader literary system of science fiction (SF): suspended between the worldbuilding demands of "hard" SF and the character-driven exigencies of its "soft" counterpart.[7] As such, space opera infrastructure exists at both interstellar and bodily scales. Space opera's interest for the energy humanities, I suggest, should derive from its intertwining of these two scales of perception and the very different attitudes they cultivate toward energy transition. In the space opera, the affects of petromodernity and its eventual ends are colored not only by triumphant technological achievement nor by uncomplicated nostalgia for past energy abundance, but also by an orientation toward energy transition embedded in the embodied subjectivity of the energy worker.

The two faces of infrastructural character

Space opera's sprawling worldbuilding and expansive plots allow the genre to approach our complicated affective relation to energy transition with a unique degree of nuance: in their multilayered worldbuilding, they remind us that human societies never operate under a single homogenous energy system, whatever the dominance of petromodernity as a horizon of human aspiration. It is this same complexity, however, that thrusts managers and engineers into prominence. On the surface, space operas grant privileged agency to characters who can leverage their sprawling societies and infrastructures to their own advantage. Space opera heroes are technocrats not merely because they wield technical expertise regarding energy systems, but because they belong to a managerial class within the labor hierarchies of their fictional worlds. *Dune*'s Paul Atriedes represents the most obvious example—though he comes from aristocratic stock, his defining feature is the meticulous leadership education he receives to fit him for the management of the vast extractive enterprise he stands to inherit. Likewise, while *Nova's* character system does not revolve so determinedly around a single hero, much of its plot also concerns a managerial technocrat, Captain Lorq Von Ray, who, like Paul, seems destined to engineer a radically changed relationship to the fuel source that powers interstellar travel—in this case, a rare element found in the heart of exploding stars. In both texts, these figures belong to a labor hierarchy that, as energy historian Cara Dagget has recently chronicled, was made possible by the equation of work and energy in nineteenth-century science and management practice.[8] They are figures whose status comes from their ability to quantify, to maximize efficiency: to engineer not only physical systems but also a living workforce.

However, space opera also teaches us to read against the grain of the dominant story of technocratic triumph, to discover variant structures of feeling lurking beneath the shiny tale of managerial heroism and nostalgic desire. Space opera plots turn on

the many ways in which characters' embodied personhood remains embedded in and continuous with the energy infrastructure of their fictive societies. At the bodily scale, the figure of the technocrat hero often comes accompanied by a double or shadow—the vulnerable and disabled energy worker, two narrative and political positions that space operas tend to condense into a single character or a tight social assemblage. In that sense, the form makes space for an affective politics of the vulnerable and disabled, acknowledging the ubiquitous nature of these conditions even in science fictional worlds premised on abundant energy and unfettered mobility. Space operas excel at undermining clear distinctions between management and labor, because they narrate the revelation through which the technocrat hero finds himself (they are nearly always men) entangled in the material and social infrastructure he supposedly manages, himself one more body indentured to the extractive system. Of course, each works on behalf of energy capital from the outset—but in their becoming infrastructural, they also become *workers* in a much more specific sense, in that they come to occupy the positionality of those whose very bodies and lives represent an extracted resource within the energy system. For this reason, space operas thematize disability as a basic condition of energetic life for the infrastructural character—perhaps unexpectedly given the genre's association valorization of mobility. And it is perhaps not coincidental that the heyday of space opera—the late 1960s moment that produced both *Dune* and *Nova*—coincided with energy workers' increasingly organized demands for disability compensation and disability rights more broadly.[9]

I call the two-faced, multi-scalar figures at the center of the space opera plot 'infrastructural characters,' to highlight their essential relationality and subordination to energy systems. In effect, these characters form what Kai Bosworth calls affective infrastructure: "a style of intensive relation or conditioning exemplified by transindividual relations," which can include not only the traditional infrastructures of our built environment but also "the unsettling situations in which people, animals, land, bodies, or ecosystem services function 'as infrastructures' for other processes."[10] In their aspect as infrastructural characters, space opera protagonists do not freely manipulate their material environments and therefore cannot fully ratify the triumphant narrative of achieving energy freedom once and for all. Rather, they experience transition as an ongoing process of change, loss, and possibility. Space operas demonstrate the co-materiality shared by both sides of a single narrative and affective coin: how the story of technocratic heroism resolves, at the level of embodied experience, into an open-ended register of transition as enduring process.

Here, I find it useful to adopt a distinction between two oppositional perspectives on affect, as theorized by Robert McRuer: the politics of affect and affective politics.

The former term refers, for McRuer, to the affective strategies "deployed by state and capital" in the service of the neoliberal project.[11] In reference to energy transition, fossil fuel interests and their allies use a politics of affect to create structures of feeling that make all alternatives to petromodernity *feel* unimaginable. For example, Dominic Boyer has recently argued that contemporary petroculture is affectively infused with a theriophobic anxiety about its own impending demise, prompting it to construct a manic politics of affect that accelerates the fossil-fueled way of life.[12] Space opera in many ways participates in and reinforces such structures of feeling, for example, by amplifying nostalgia for the moment of the genre's origin in the mid-twentieth century, before anxieties about resource limitation and environmental collapse became central to the energy imaginaries of the Global North, and by displaying the spectacle of petromania on a galactic scale. Moreover, space opera characters actively wield a politics of affect grounded in nostalgia, wonder, and triumphalism within the energetic imaginaries of their fictional worlds.

But as a noncognitive mode of relation to lived experience, affect represents not only a tool for political capture but also an intensity in excess of received political narratives. By contrast with the politics of affect, McRuer identifies oppositional groundswells of "affective politics," which arise out of potentialities inherent within social movements and have the power to upend established ways of life.[13] The affective politics that interest McRuer are those that threaten to disrupt "the smooth functioning of globalized neoliberal capitalism," and are rooted in his claim that the disabled bodies and subjectivities are effective agencies of that disruption.[14] Taking inspiration from McRuer's efforts to 'crip' dominant narratives of political economy, I locate an affective politics of energy transition in space opera's infrastructural characters and their recurrent thematization of disability. Far from eliminating forms of embodied dependence, vulnerability, and finitude from its imagined futures, the space opera genre has often made such experiences central to its depiction of energy infrastructure.

In short, popular space operas from the late 1960s offer us important narrative resources for responding within and against the dominant politics of affect with which our own political leaders often approach energy transition. In these fictional worlds, technocrat heroes might wield powerful affect-laden tools of persuasion, advocating their energy transition agenda by celebrating energetic independence, and reveling in the transcendence of embodied constraint that science fictional technology purports to grant them. But because they are doubled by the much more marginal figure of the energy worker, these characters are also caught up in minor, emergent affective potentialities. Such narratives thus encode alternate patterns of affective response that exceed and, in some ways, undo the genre's surface celebration of freedom from material dependency,

empowerment over one's environment, and the mania that ensures the perpetuation of extractivism. In what follows, I will consider two texts that demonstrate how space opera's infrastructural characters encode the affectual experience of lives lived within our already impossible energy infrastructure. These characters' variously vulnerable, dependent, and prosthetic relations to energy allow them to experience transition as an open-ended becoming that changes our sense of what it means to be human.

Dune's Affects of Energetic Dependency

Frank Herbert's *Dune* books represent both a landmark of the science fiction tradition more broadly and a primary representative of the space opera genre. The original *Dune*, published in 1965, is often read as a rich environmental allegory, notable for its aspiration toward planetary ecology, its seemingly prescient depiction of geopolitical tensions over fossil fuel resources, and its central conflict between indigenous environmental futurity and the forces of unfettered extractivism.[15] The novel is set in a distant future in which faster-than-light travel depends on a substance known as "spice" that confers a limited awareness of the immediate future on space navigators. The spice must be mined on the single planet on which it is found—Arrakis, or Dune—whose indigenous people are both essential to the extractive operation and awaiting the arrival of a savior who will free them from imperial rule and allow the furtherance of their terraforming project to remake the desert world into a water-rich oasis. *Dune*'s popular success likely relies on more than these elements, however, as the novel eschews the dense technicalities of hard science fiction and balances its grand intergalactic politics with a healthy dose of protagonist-driven action adventure. *Dune* is as memorable for its bildungsroman hero plot—the young Paul Atriedes coming into his full powers and emerging from exile to claim his place as emperor of the known universe—as it is for the hallucinogenic spice that drives its galaxy-spanning economy. (The recent film adaptation, for example, capitalizes far more on the former than on the latter). But as a complex and insightful parable of energy transition, *Dune* stands the test time, revealing a great deal about the aspirations of an oil-addicted empire about to face the consequences of its dependencies, and about the utopian alternatives it was possible to imagine on the eve of global energy crisis.

I would argue, however, that all these reasons make Herbert's much less read sequel, *Dune Messiah*, an equally important text for understanding the affects and imaginaries of energy transition that suffuse the late twentieth century. The original novel contains only trace hints of ambivalence toward Paul's status as both the technocrat hero capable of fixing the broken system of spice extraction *and* the promised messiah who will lead the indigenous energy workers into a resource-rich future—but the second installment

leans heavily into this contradiction. Firmly installed as emperor at the opening of *Dune Messiah*, Paul makes nobody happy. In the first novel, he stars as the protagonist of a classic bildungsroman, undergoing a necessary education in the planetary realities of his new home, the lifeworld of its indigenous people, and the ecology that allows both to subsist. Upon his coming of age, he becomes an invincible power that upends the political balance. But if the first novel transformed Paul from gifted teenager to god-emperor, in the second he undergoes a further metamorphosis into a blind prophet who can no longer rule but must instead wander off into a desert exile. It is this latter transition that more thoroughly interrogates the situation of the infrastructural character coping with energy transition.

Throughout the series, Herbert's allegory of energy transition centers on the tight relationship between energy systems and the meaning of human identity, and in following Paul past the endpoint of his apotheosis, the novels propose disabled subjectivity as the very condition of energetic life. Initially, however, the series must overcome its reliance on a more familiar metaphor for energy use: addiction. That the West is "addicted to oil" has become a truism in the twenty-first century, so much so that even such a committed oilman as George W. Bush used the phrase in a 2006 State of the Union address.[16] But Herbert navigates the complex slippage between allegories of addiction and allegories of disability, demonstrating how the former serves a high-energy politics of affect that the latter ultimately subverts. The series ties the ecological and social fates of the planet Arrakis to the mélange spice it alone can produce, on which the galactic empire depends for interstellar travel. Without the spice, the interconnectivity that makes possible galactic governance will inevitably collapse. Spice addiction incurs material limitations, as one character explains early in the second novel: "it ties [the user] to a cruel addiction and marks his eyes as yours are marked: total blue without any white. Your eyes, your organs of *sight*, become one thing without contrast, a single view."[17] Spice brings down more than one emperor over the course of the series, implying that no social organization grounded on this dependence can hope for lasting stability. But already, in the series' interest in eyes and blindness as the locus of the drug's body-altering effects, we can see how the novels open the door to an alternative understanding of energy dependence through their examination of disabled subjectivity.

As a stand-in for extractive energy sources, the spice provides the hinge that positions Paul as an infrastructural character. It provides him both the omniscient view from nowhere of the technocrat engineer, but it also transforms his body through disability. In parallel, Paul's spice dependency gives him galaxy spanning power but also binds his fate to the disenfranchised indigenous communities who labor to extract

it. The novel's greatest sympathy is directed toward the indigenous population of Arrakis, the Fremen, who are both the agents and victims of an anticipated transition. Though the Fremen are the energy workers of the spice economy—they produce it and depend on it for their tribal rituals—they also set their sights on a prophesized future that will end or greatly reduce spice production. They await a promised messiah, whose coming will hasten the transition process. That messiah is of course Paul, whose joint affiliation with both the Fremen labor force and the centers of planetary power give him the two-faced qualities of an infrastructural character. As a leader, Paul has all the qualities of a gifted social and environmental engineer. A veritable human computer, he bends humans and sandworms alike to his will. But as he succumbs to the spice addiction, Paul experiences all the bodily and cognitive changes that addiction entails. By the middle of the second novel, Herbert has literalized the metaphor of blindness that runs throughout the series: Paul loses his sight in an explosion, and begins to rely on the second, prescient sight granted to him by the spice.

The shift from addiction to blindness as dominant metaphor allows the *Dune* novels to navigate away from what initially seems like an uncomplicated tale of transition without loss in the pursuit of energy independence. In the first novel, *Dune* describes how the forces of expertise and rationality triumph over greed and addiction. Paul rides his dual identity to the imperial throne, the managerial class ascendent, without losing his Fremen affinities or the sympathy toward labor that they engender in him. This story, in which energy transition is achieved without altering any of the underlying social or political conditions—merely substituting a more sympathetic emperor for a presumed tyrant—is part of what makes *Dune* so satisfying to its millions of fans. But if we read further into the series, we discover that merely breaking the production monopoly—or rather, transferring it from one power to another—does not cure the resource addiction. *Dune Messiah* provoked a puzzled reaction from audiences, in part because it so thoroughly unveils the vulnerabilities of the technocrat hero protagonist. As Herbert's son Brian recounts in a 2007 introduction to the novel, "Many readers didn't want that dose of reality; they couldn't stand the demotion of their beloved, charismatic champion."[18] But the disappointments of the second novel run even deeper, representing an uncomfortable realization regarding the imagined energy transition. *Dune Messiah* insists that there is no such thing as transition without loss.

Herbert's second novel thus represents a new experiment in narrating transition: it voluntarily gives up the politics of affect that valorizes energy independence as a glorious future horizon. The shifting meanings of blindness in the novel play an important role in this departure. Up until Paul loses his sight, blindness is figured as a lack—a physical weakness that has no place in Fremen culture and a fatal flaw that might make

the spice-addicted vulnerable to counter-revolutionary conspiracy. Blind Fremen are expected to commit ritual suicide by walking into the desert rather than become a liability for their tribe. But Paul fractures this understanding of blindness. At first, it seems that his second sight merely introduces an equally simplistic understanding of disabled persons as somehow superhuman: "*There are many degrees of sight and many degrees of blindness*, Paul thought....*What sense do we lack that we cannot see another world all around us?*"[19] Relying merely on the spice-prescience to navigate the events of the novel, Paul indeed appears to others to have accessed another world. His enemies suspect that this increased dependence on the spice makes him even more vulnerable to overthrow. But at the novel's conclusion, the spice becomes the vehicle for a kind of intergenerational dependency that saves Paul's life. He is able to 'see' from the point of view of his newborn son, an intersubjective miracle that lets him take decisive action to save both his own life and his imperial dynasty.

It is perhaps easy to miss how thoroughly this revision of blindness's allegorical meanings from one novel to the next also alters the affective landscapes of energy transition. After all, in *Dune*, blindness initially designated those who lacked 'vision,' in the word's cheesy corporate usage—those who were unable to imagine future possibilities with sufficient creativity. At the end of the first novel, Paul strides into the emperor's throne room wielding the familiar rhetoric of energy independence. Paul's heroics bring about a veritable humiliation of the previous extractive order, revealing that the mighty spacing guild does not so much control the means of space travel as they are fatally reliant on it for the very coherence of their lifeworld. The emperor has this realization as he overhears the guildsmen's confounded conversation: "Were these two so dependent upon their *faculty* that they had lost the use of their eyes and their reason? he wondered."[20] The novel calls out this weakness as "the clear, safe course that leads ever downward into stagnation."[21] The unimaginable and unnarrated transition that Paul's reign will apparently witness will lead to renewal, freedom, and unpredictability. *Dune* seems to say: who knows what the energetic future might hold, but we must place our faith in independent human ingenuity, rather than *blindly* trusting in the status quo. Transition here means exiling these forms of blindness—whether by casting the blind out of the human community or by cutting off the otherwise blind guildsmen from their spice supply. Dependency is weakness; transition the means to overcome it.

But this is not the story Herbert tells in *Dune Messiah*, where Paul's blindness locates him in an assemblage of multidirectional dependencies. In the pivotal moment, Paul relies on the eyes of his newborn son, Leto. And of course, as an infant (though one with superhuman cognition and memory), Leto is physically dependent on the adults around him. Bound together by their shared spice-awareness, father and son save

each other's future. In this turn of the plot, energy dependence is not a weakness to be overcome, but the very condition that makes the future possible. This dependency links energetic life across generations. This moment of embodied intertwining allows Paul to let go of his drive toward immortality, and facilitates a transition of both power and protagonicity between one generation and the next—as the further sequels confirm. Precisely because it entails a condition of radical reliance on other persons and things, Paul's blindness does not seal him off in a closed chamber of self-regard, but rather constitutes a necessary form of openness. Read this way, Paul's decision to accept self-exile at the end of the novel is not an acquiescence to the Fremen's objectionable characterization of blindness as liability. Rather, it represents Paul's effort to surrender his identity as technocrat hero, the ecological engineer who stands above planetary, political, and social systems, manipulating them for his own ends. Instead, he places himself fully at the mercy of the planet's ecology.

Herbert's twice-told story of transition thus fully revises its affective repertoire between one novel and the next. *Dune Messiah* enacts this revision, paradoxically, by looking backward to the middle sections of the first novel: it acknowledges audiences' nostalgia for the earlier text, for the romance of the Fremen's desert life, for the localism of their small-scale efforts to terraform the planet and the satisfactions those efforts entailed, for the mutual dependencies of their tribal community, and for a bildungsroman that was still in process as Paul's adopted Fremen family shaped him into the protagonist of history he had not yet become. The ending of *Dune Messiah* does, in many ways, return audiences to this earlier narrative moment, its settings, values, and feelings. In doing so, it gives up the fantasy of transition without loss, because many things are lost in this return with a difference: the triumph of heroic techno-optimism, and the prospect of transition as a discrete temporal achievement. In fact, *Dune Messiah* pushes the horizon of completed transition further into the future, allowing the Fremen to reinhabit their identities as terraforming laborers, and opening the way for more novels. Space opera's endless spooling out of narrative—the genre's formal expansiveness— occurs not just as an effect of its imperialist ambition, nor a deferred obsolescence of petromodernity, but also proves coincident with its efforts to think transition as an ongoing, open-ended process.

Herbert's novels ultimately struggle to reconcile the intuition about the ongoingness of energy transition with the discrete aim of emancipation. The series makes the Fremen pay the price of its suspended narrative closure, because their political liberation depends on achieving energy independence. *Dune* thus ultimately remains committed to 'human resources' as the necessary condition of energetic life—its worldbuilding requires that the Fremen cling to their identities as the self-abnegating tributes of the

energy system, and that Arrakis remain a space where revolution is always in the offing, but never immanent. To close out this article, then, I would like to turn to a space opera that forcefully interrogates this relationship between labor and energy transition.

Nova and the Future of Energy Work

Published in 1968, Samuel Delany's second novel *Nova* appeared in print between the first and second *Dune* novels and invites many comparisons with Herbert's series. But unlike *Dune*, *Nova* evinces a deep skepticism of the techno-heroic energy transition from its very first page. In a scene that self-consciously recalls Coleridge's "Ancient Mariner," a ravaged cyborg pilot confronts a young gypsy named Mouse who is about to ship out on his first real voyage, to warn him about the costs of questing after new energy sources. That the novel chooses to begin with this scene, and delays the full introduction to its more traditional hero-figure, Captain Lorq Von Ray, until the third chapter suggests Delany's intent to trouble the protagonicity of the technocrat who brings about a new era of energy abundance through the force of his charisma and personal desire. Instead, it begins with the energy worker, Dan, whose body bears the material record of his extractive adventures. "I'm blind, boy," Dan tells Mouse, "But with a funny kind of blindness....Most people go blind in blackness. I have a fire in my eyes. I have that whole collapsing sun in my head, my visual tectum shorted wide open, jumping, leaping, sparking."[22] If, for Paul Atriedes, blindness signifies an undeniable dependency on the energy infrastructure in which his life unfolds, for Dan it is a condition of overexposure—of being too raw to the world around him, laid open by his encounter with the fuel source that powers the galaxy. Delany's novel turns out to be obsessed with overexposure, which figures the experience of living and working in an energy system that permeates personal identity down to the very substate of physical embodiment.

Nova's characters explicitly recognize that their identities are fully bound up in their relationship to energy—specifically, to the myth-worthy substance called illyrion that fuels both plot and spaceship. A heavy metal that can be produced synthetically or mined laboriously in the Outer Colonies at the edge of human civilization, illyrion represents "the only way to way to get enough power to hurl ships between worlds, between stars."[23] Illyrion also determines the conditions of labor for human beings all over the galaxy and, in a very direct way, for the seven billion inhabitants of the Outer Colonies. Those who "descend beneath the waves" to mine illyrion apparently experience horrifyingly difficult work conditions, a circumstance they alleviate with recourse to the hallucinogenic drug "Bliss."[24] Thus *Nova* echoes *Dune*'s continuity between energy addiction and substance abuse. We get the clearest picture of these

energy workers from Mouse's crewmates, the siblings, Lynceos and Idas, who have left behind their third triplet, Tobias, in an Outer Colonies mine. (As another character explains, one in three inhabitants of the Outer Colonies spends their entire working life engaged in the production of illyrion). Despite the hardship, Tobias apparently chooses to stay in the mines of his own accord. As his brother recounts, "His hands had taken up the rhythms of the tides, the weight of the ore became a comfort on his palms."[25] Tobias represents one of *Nova*'s many visions of the infrastructural character in his aspect as energy worker, his body open and attuned to the material processes of extraction. He takes comfort in his embodied entanglement with—and overexposure to—the illyrion industry.

Though Tobias's history reeks of false consciousness, his experience with energy work must also be read in the context of *Nova*'s thematic interest in embodied labor as a form of self-fashioning. In the world of the novel, cyborg labor has become the norm, replacing automated robotics and white-collar computer work with a new physicality. Delany's characters attribute this shift to a twenty-third century philosopher named Ashton Clark, who apparently realized that "If the situation of a technological society was such that there could be no direct relation between a man's work and his *modus vivendi*, other than money, at least he must feel that he is directly changing things by his work....He must exert energy in his work and see these changes occur with his own eyes."[26] Many readers have focused on the utopian tinge of this worldbuilding element, tracing it back to Delany's self-declared identity as "a boring old Marxist."[27] For example, Lysa M. Rivera contrasts the labor imaginaries of the Outer Colonies with the cyborg labor system attributed to Clark, arguing that while the former "recalls the histories of resource extraction (i.e., slave labour) under colonialism," the latter "imagines an alternative to alienated labour."[28] But I would contend that the novel does not uncritically endorse Clark's vision. Rather, it draws a direct line between Tobias's addiction to minework and the forms of embodied attachment Clark theorizes for cyborg waldo work. This resemblance should make us suspicious of the Clarkian revolution as a solution to the woes of alienated labor.

Moreover, while Clark's philosophical realization arises out of a nostalgia for the imagined past of manual labor, *Nova* is a text that satirizes nostalgia at every turn. For example, one character spends the entire plot preparing to write a novel, out of fond nostalgia for the obsolete literary form. (No one in the thirty-second century reads novels because they have ways of perfectly capturing and re-playing embodied experience). Other characters react to his plans with semi-comic disinterest or confusion. The novel's ridicule of nostalgia extends to energetic life, as well. The villain of *Nova*, Prince Red, throws himself an elaborate party in Paris for which he has the

entire Ile-St. Louis wired for electricity. According to his sister, "He thought electric light would be more romantic than the perfectly good induced-fluorescence tubes that were here yesterday."[29] Prince's nostalgia for an older energy source provokes exasperation—it is an extravagance and an affectation.

Like these other forms of nostalgia, Ashton Clark's intellectual contribution—the idea that human society will return to an almost pre-lapsarian mode of production by literally plugging themselves into their machinery—comes across as, at best, a bit silly, and at worst, a dehumanizing refiguration of the relationship between humans and their energy systems. By "plugging in" to the various infrastructures of their industrialized societies, the workers of Ashton Clark's future society not only become infrastructural, they also enfold the energy logics of labor into their very bodies, turning themselves into power sources. Thus, work becomes the only imaginable mode of life for the ideal Clarkian subject. Work is refigured as organic relationality, like the rhythm of the tides or the weight of ore in one's hands.

Recent scholarship in the energy humanities should allow us to place this imagery in its historical and political context. In *The Birth of Energy*, Dagget details how such organic metaphors for energy systems participate in the depoliticization of work. Via the emergence of thermodynamics and ecology in the nineteenth century, Dagget argues, living organisms could be understood in terms of energy conservation and waste, such that work and its technocratic management were natural necessities rather than political contingencies.[30] Ashton Clark's cyborg innovation merely reinstates this organicism within an increasingly automated labor landscape, re-opening the 'natural' way of work whereby the worker "must exert energy" and see the consequences "with his own eyes."[31]

Further, in the world of *Nova*, seeing things with one's own eyes can be a form of dangerous overexposure to which energy workers are potentially subjected. Tobias's entrapment in the illyrion mine is one expression of this danger. The overexposure to the dying star that both Dan and Lorq experience on different missions to extract illyrion offers another model of what happens when laboring bodies enter into too-close proximity with energy systems. These characters literally see the source of illyrion with their own eyes—and the experience leads to their eventual deaths.

As an alternative to these allegories of overexposure and overidentification, *Nova* proposes prosthesis as the desirable mode of relationality between the humans and their energy systems. Importantly, moments of utopia in *Nova* arise when the prosthetic relation between self and other remains one of friction and imperfection. By plugging the worker into his machinery, Ashton Clark's labor system enacts the too-perfect logic of the prosthesis theorized by philosopher David Wills: the Clarkian

system "provides the body with the necessary illusion of its successful entrance into the space of the Other."[32] Such seamless prosthesis is personified in the novel through its tragic villain, the wealthy heir to illyrion fortune, Prince Red. Prince's tragic flaw lies in his inability to acknowledge prosthesis as a way of life. He insists that everyone around him perform absolute unawareness of his illyrion-powered artificial arm, and reacts with explosions of violence whenever a character inadvertently directs attention to his disability. For Prince, such manifest illyrion dependency truly represents one of the humiliations of modernity—a stark limitation of the otherwise limitless power that accrues to his tycoon family.[33]

Prince represents only one of the many iterations of the infrastructural character as disabled subject in Delany's novel—Dan, Mouse, and Lorq Von Ray represent other examples—each of whom offers a different take on the properly prosthetic relation to energy infrastructure. But only one of these characters survives until the novel's final page. Like Prince, the young cyborg stud Mouse has a physical impairment that leads him to rely on an illyrion-powered prosthetic supplement. Though it goes mostly unremarked over the course of the novel, Mouse has a birth defect, a "ruined larynx" that means his "words came with gushes of air through ill-anchored vocal chords."[34] The defect cannot be corrected for the same reason that Dan cannot be cured of his sensory overload and Prince cannot regrow or graft his arm: it is not located in the body but in some deeper sense of self.[35] But Mouse becomes a virtuoso on an instrument known as the sensory-syrynx, an illyrion battery theremin that plays music for all five senses. In place of a full vocal range, Mouse's prosthesis gives him a multi-dimensional artform. And he does not try to reject and repress his illyrion dependency in the manner of Prince Red, but rather, clings to it and revels in it. It is this prosthetic relation to energy—as that which both enables his being in the world and which is, at the same time, not fully part of himself—that allows Mouse to approach energy transition as an opportunity for play, rather than an impetus or a demand for new forms of labor. After Mouse and the rest of Lorq's crew bring about a new era of illyrion surplus, Mouse affirms not the triumph of an achieved quest, but the openness of the future before him: "There's still a lot to see, a lot I have to play."[36] The crew feel that the future looks bright in the transport and navigation sectors, and speculate about finding another ship. But Mouse does not frame this decision through the pleasures of embodied labor—indeed, for him, it is not work at all, but rather, a form of creative play that fuels his artistic practices. The horizon of *Nova*'s futurism is thus not, as Rivera suggests, the realization of "living labor" as an alternative to slavery, but rather, an end to work altogether.

In swerving away, in its final pages, from an emphasis on labor and the conditions thereof, *Nova* anticipates considerations of a post-work society that have recently

gained traction in the energy humanities. As Dagget argues, the depoliticization of work that has become a pervasive condition of life under global capitalism that blocks us from imagining not only new modes of production, but also new energy cultures.[37] Likewise, Boyer explains that energy transition and other traditionally environmentalist projects have too often been framed as "hard work," such that they paradoxically *increase* the energetic demands of societies that pursue them. Following this recognition, he proposes that imagining and enacting transition should be as much a form of play as a laborious task, and calls on us to embrace the "experimental and ludic" aspects of the energy transition project.[38] Though *Nova* does not try to think into the future of the new energetic landscape, or spend too much time hammering out the details of its characters' changed lives, it does insist that what follows will bring an end to work as they know it; what follows will take the form of play.

Nova thus has a different temporal relation to transition than we found in the *Dune* novels. For Herbert's Fremen, transition was something to be deferred in order to prolong the forms of labor and community that were involved in working toward a future horizon of energy transition. But in *Nova*, transition represents only the starting point of an ongoing process, rather than the future achievement of our present efforts. To hammer the point home, Delany leaves the novel literally open-ended, cutting off before the final word of the final sentence in order to suspend the closure of form. Delany solves space opera's problem with endings in a unique way: not by serialization, but by refusing to write an ending.

Anticipations

As this missing closure suggests, space operas, admittedly, are not very good at showing us concrete images of possible post-carbon futures. They do not provide social, political, or technological roadmaps to lead us out of petromodernity. They lack the literary infrastructure for that imaginative project by their very definition, and in their most self-conscious iterations, they can only admit this insufficiency. If these texts and the many others that reshuffle similar energetic tropes have something to teach us about transition, the lesson generally does not involve piquing our aspirations with utopian plausibility. In Jamesonian terms, we might say that the texts I discuss in this article nurture a utopian impulse, one that drives their protagonists to seek a more just energo-political situation for their fictive societies. But they do not achieve or promote a particular systemic utopian in which energy abundance and technological innovation bring about the end of energy history.[39] I argue that it is precisely in avoiding the stasis of achieved utopia that space opera keeps open its anticipatory relationship to the future of energetic life. Despite the apparent parameters of the genre, space operas cannot

seem to avoid undermining their moments of triumphant energy capture. In one novel, Paul Atriedes ascends the throne and declares a new era of imperial monopoly. In the next, he walks alone into the desert. In one scene, the crew of the Roc captures seven tons of illyrion, but by the next chapter, they do not know what form their lives will take after the end of illyrion scarcity.

These examples demonstrate that even if the space opera presents us with a flashy display of commitment to a high-energy extractive future, the stories it tells of transition register an affective shift away from that commitment. The genre that seems most confident in its prediction that the human species will continue its extractive expansion even beyond the gravity well of our own planet still registers the possibility—or even historical necessity—of a changed relation to energy. In short, space opera demonstrates that the powerful myth of transition without loss carries with it the seeds of its own undoing.

Moreover, this feature of the genre continues to shape its forms and affects as they address the energy anxieties of the 21st century: it is not merely a historical artifact of the late-1960s. Indeed, the literary historical moment I discuss in this article has continued relevance to the cultural productions of our contemporary moment. Consider one of the most on-the-nose current fictions of energy transition—an intra-solar system space opera of very recent vintage—AppleTV's *For All Mankind*. The streaming series is unique in its depictions of everyday in life in fictional twentieth century whose social and political realities are no longer bound to fossil fuels. By imagining an alternate history in which the space race between the U.S. and the Soviet Union remains a vigorous driver of sociopolitical change even after the first moon landing, the show rewrites the late twentieth century as a space opera, in which various nations and private interests compete and collaborate in the colonization of the solar system. To fuel this endeavor, the show proposes the vastly accelerated development of helium fusion, an energy source often proposed as the ultimate utopian solution to the twin challenges of climate change and peak oil. But fascinatingly, *For All Mankind* does not suppose that such a transition would occur without loss, on a wave of positive affect. The emotional peaks of soaring technological and managerial ingenuity provide the show—like many space operas—with its affective bread and butter, but the other structures of feeling that accompany energy transition give it pause.

In particular, like the older space operas I discuss above, the show takes pains to construct its most techno-heroic protagonists as infrastructural characters, bound to the fate of the pre-transition infrastructural worlds that formed them. In the final episode of the 2022 season, the head of NASA stands before Mission Control and declares, "the future is ours for the taking!"[40] But outside, hordes of unemployed

oil and coal workers protest the agency's pursuit of Helium fusion technology. The agency's increasing indebtedness to the energy technologies it has catalyzed mean the end of its identity as a purveyor of uncomplicated heroics. Both the energy workers and the aerospace engineers that pilot NASA's shuttles have become infrastructural characters whose fates are bound up with the obsolescing institutions that shaped their identity. By the time the fourth season rolls around, energy workers and pilot-engineers are forced to form uneasy alliances in the face of their shared vulnerabilities. And (without spoiling a plot point that I lack the space to discuss here) I note that *For All Mankind* demonstrates how the affective politics of labor movements can be harnessed by regressive energy interests as easily as they serve the advocates of energy transition.

The space operas of the current century thus continue to use the genre as a counter to and a caution against the politics of affect that accrue around the dominant political narratives of energy transition. The structures of feeling that accrue around both space opera and the politics of transition have not necessarily changed substantially across the decades of the genre's maturity. In 1973, in the throes of the OPEC embargo, Richard Nixon famously declared that the energy crisis was "no crisis of the American Spirit."[41] Implicitly, Nixon had declared a kind of transition without loss: from the extraction of Middle Eastern oil to the extraction of that more nebulous resource, American techno-optimism. In 2011, speaking to an audience of Georgetown University students in the midst of his re-election campaign, Barack Obama would echo that same politics of affect, noting that even though America's oil reserves are comparatively small, "we boast one critical, renewable resource that the rest of the world can't match: American ingenuity. American ingenuity, American know-how."[42] Space opera unexpectedly reveals the subversive affects that take hold even within the siren call of this seductive political rhetoric. In its historical and contemporary iterations, the genre demonstrates that American ingenuity is *not* a renewable resource, and that to find oneself construed as the site of ingenuity's extraction means to occupy the two-faced and affectively ambivalent position of the infrastructural character. Like the audience of university students Obama addresses, infrastructural characters find themselves both in the identity of the technocratic hero striving to "win the future" (as Obama put it) *and* in the identity of the energy worker whose very lifeforce is the extracted resource of the energy system. Space opera shows us what that identity feels like in a series of vivid images: how such characters get burned out and burned up in pursuit of the transition supposedly without loss, how their aspirations ultimately lead beyond the logic of techno-optimism, into the unnarrated future.

Notes

[1] Alastair Reynolds, "space opera: this galaxy ain't big enough for both of us" in *Strange Divisions & Alien Territories: The Sub-Genres of Science Fiction*, ed. Kenneth Brooks (Palgrave Macmillan, 2012): 12.

[2] Graeme Macdonald, "Improbability Drives: The Energy of SF," *Paradoxa* 26 (2014): 121.

[3] Imre Szeman, "Literature and Energy Futures," *PMLA* 126, no. 2 (March 2011): 325. See also Szeman's further development of this critique in "System Failure: Oil, Futurity, and the Anticipation of Disaster," *South Atlantic Quarterly* 106, no. 4 (Fall 2007): 805–23.

[4] Bradon Smith, "Imagined Energy Futures in Contemporary Speculative Fictions," *Resilience: A Journal of the Environmental Humanities* 6, nos. 2–3 (Spring-Fall 2019): 139.

[5] Petrocultures Research Group, *After Oil* (2016), 32–33.

[6] PRG, *After Oil*, 32.

[7] For a concise theorization of the difference, see Gary Gibson, "from slide-rules to techno-mystics: hard sf's battle for the imagination," in *Strange Divisions & Alien Territories: The Sub-Genres of Science Fiction*, ed. Kenneth Brooks (Palgrave Macmillan, 2012): 1–11.

[8] See Cara Daggett, *The Birth of Energy: Fossil Fuels, Thermodynamics, & the Politics of Work* (Duke UP, 2019): 162–86.

[9] For an overview of these movements, see Audra Jennings, "Organized Labor and Disability in Post-World War II United States," in *The Oxford Handbook of Disability History*, ed. Michael Rembis, Catherine Kudlick, and Kim E. Neilsen (Oxford UP, 2018), 247–62 and Kim E. Nielsen, *A Disability History of the United States* (Beacon Press, 2012), chapter 8 in particular. A big thank you to Trish Kahle for pointing out the relevant labor and disability history contexts after reading an early draft of this article.

[10] Kai Bosworth, "What is 'affective infrastructure'?" *Dialogues in Human Geography* (2022): 3.

[11] Robert McRuer, *Crip Times: Disability, Globalization, and Resistance* (NYU Press, 2018), 30.

[12] Dominic Boyer, "Death, Anxiety, and Fossil Fuels" in *Anxiety Culture: The New Global State of Human Affairs*, eds. John P. Allegante, Ulrich Hoinkes, Michael I. Schapira, and Karen Struve (Johns Hopkins UP, forthcoming): 70–83.

[13] McRuer, *Crip Times*, 30. McRuer derives this term from Jasbir K. Puar's theorization of affective politics in *Terrorist Assemblages: Homonationalism in Queer Times* (Duke UP, 2017).

[14] McRuer, *Crip Times*, 23–4.

[15] In his bibliography of ecological science fiction, Gerry Canavan notes that *Dune* "ranks among the best allegorizations of U.S. energy policy and Middle East imperialism ever achieved in SF." See Gerry Canavan, "Of Further Interest" in *Green Planets: Science Fiction and Ecology*, eds. Gerry Canavan and Kim Stanley Robinson (Wesleyan, 2014): 266–7.

[16] The addiction metaphor has an oft-remarked persistence in American political rhetoric. See, for example, William S. Becker, "The cure for our oil addiction," *The Hill*, March 1, 2022 and Elisabeth Bumiller and Adam Nagourney, "Bush: 'America is addicted to oil,'" *The New York Times*, Feb. 1, 2006.

[17] Frank Herbert, *Dune* (Ace Books, 2007): 2.

[18] Brian Herbert, "Introduction," in *Dune Messiah* by Frank Herbert (Ace Books, 2008): viii.

[19] Frank Herbert, *Dune Messiah* (Ace Books, 2008): 186. Italics in the original.

[20] Herbert, *Dune*, 756.

[21] Herbert, *Dune*, 767.

[22] Samuel R. Delany, *Nova* (Vintage Books, 2002): 4.

[23] Delany, *Nova*, 89.

[24] Delany, *Nova*, 34.

[25] Delany, *Nova*, 34.

[26] Delany, *Nova*, 218.

[27] Samuel R. Delany, *Conversations with Samuel R. Delany*, ed. Carl Freedman (University of Mississippi Press, 2009): 164.

[28] Lysa M. Rivera, "Labor Imaginaries in Samuel Delany's *Nova*," *Canadian Review of American Studies* 50, no. 10 (Summer 2020): 245, 246.

[29] *Nova*, 79.

[30] Dagget, *The Birth of Energy*, 16.

[31] Delaney, *Nova*, 218.

[32] David Wills, *Prosthesis* (Stanford UP, 1995): 141.

[33] I borrow this phrase, "humiliation of modernity," from Stephanie LeManager, who uses it to describe the spectacle of the BP catastrophe in the Gulf of Mexico. See Stephanie LeManager, "Petro-Melancholia: The BP Blowout and the Arts of Grief," *Qui Parle: Critical Humanities and Social Sciences* 19, no. 2 (Spring/Summer 2011): 26.

[34] Delany, *Nova*, 6, 10.

[35] Delany, *Nova*, 214.

[36] Delany, *Nova*, 240.

[37] Dagget, *The Birth of Energy*, 197.

[38] Dominic Boyer, "Revolution and *Revellion*: Toward a Solarity Worth Living," *South Atlantic Quarterly* 120, no. 1 (Jan. 2021): 34.

[39] See Frederic Jameson's discussion of programmatic utopia and the utopian ideological impulse in *Archaeologies of the Future: The Desire Called Utopia and Other Science Fictions* (Verso, 2005): 3–4.

[40] *For All Mankind*, season 3, episode 10, "Stranger in a Strange Land," directed by Craig Zisk, written Matt Wolpert & Ben Nedivi, aired Aug. 12, 2022, https://tv.apple.com/us/episode/stranger-in-a-strange-land/umc.cmc.2rv8tr1iwdl7ucsgak-365ma6k.

[41] Richard Nixon, "The Energy Emergency" (Nov. 7, 1973).

[42] Barack Obama, "Remarks by the President on America's Energy Security" (Mar. 20, 2011).

Acknowledgements

I would like to thank several of the people who provided invaluable feedback and input during the writing and revision of this article: my co-organizers at the Georgetown Qatar Program in Energy Humanities: Trish Kahle and Firat Oruc, the amazing team at the Center for International and Regional Studies: Zahra Babar, Misba Bhatti, and Suzi Mirgani, and my co-contributors to this special issue: Dominic Boyer, Animesh Chatterjee, Ewan Gibbs, and Anne Pasek.

Competing Interests

The author has no competing interests to declare.

References

Becker, William S. "The cure for our oil addiction." *The Hill*, March 1, 2022.

Bosworth, Kai. "What is 'affective infrastructure'?" *Dialogues in Human Geography* (2022): 1–19.

Boyer, Dominic. "Death, Anxiety, and Fossil Fuels" in *Anxiety Culture: The New Global State of Human Affairs*. Edited by John P. Allegante, Ulrich Hoinkes, Michael I. Schapira, and Karen Struve. Johns Hopkins UP, 2024 (forthcoming).

---. "Revolution and *Revellion*: Toward a Solarity Worth Living." *South Atlantic Quarterly* 120, no. 1 (Jan. 2021): 25–37.

Bumiller, Elisabeth and Adam Nagourney. "Bush: 'America is addicted to oil.'" *The New York Times*, Feb. 1, 2006.

Canavan, Gerry. "Of Further Interest." In *Green Planets: Science Fiction and Ecology*, edited by Gerry Canavan and Kim Stanley Robinson, 261–82. Wesleyan, 2014.

Daggett, Cara. *The Birth of Energy: Fossil Fuels, Thermodynamics, & the Politics of Work*. Duke UP, 2019.

Delany, Samuel R. *Conversations with Samuel R. Delany*, edited by Carl Freedman. University of Mississippi Press, 2009.

---. *Nova*. Vintage Books, 2002.

Gibson, Gary. "from slide-rules to techno-mystics: hard sf's battle for the imagination." In *Strange Divisions & Alien Territories: The Sub-Genres of Science Fiction*, edited by Kenneth Brooks, 1–11. Palgrave Macmillan, 2012.

Herbert, Brian. "Introduction." In *Dune Messiah* by Frank Herbert. vii-xii. Ace Books, 2008.

Herbert, Frank. *Dune*. Ace Books, 2007.

---. *Dune Messiah*. Ace Books, 2008.

Jameson, Frederic. *Archaeologies of the Future: The Desire Called Utopia and Other Science Fictions*. Verso, 2005.

Jennings, Audra. "Organized Labor and Disability in Post-World War II United States." In *The Oxford Handbook of Disability History*, edited by Michael Rembis, Catherine Kudlick, and Kim E. Neilsen, 247–62. Oxford UP, 2018.

LeManager, Stephanie. "Petro-Melancholia: The BP Blowout and the Arts of Grief." *Qui Parle: Critical Humanities and Social Sciences* 19, no. 2 (Spring/Summer 2011): 25–56.

Macdonald, Graeme. "Improbability Drives: The Energy of SF." *Paradoxa* 26 (2014): 111–44.

McRuer, Robert. *Crip Times: Disability, Globalization, and Resistance*. NYU Press, 2018.

Nielsen, Kim E. *A Disability History of the United States*. Beacon Press, 2012.

Nixon, Richard. "The Energy Emergency." Nov. 7, 1973.

Obama, Barack. "Remarks by the President on America's Energy Security." Mar. 20, 2011.

Petrocultures Research Group, *After Oil* (2016), 32–33.

Puar, Jasbir K. *Terrorist Assemblages: Homonationalism in Queer Times*. Duke UP, 2017.

Reynolds, Alastair. "space opera: this galaxy ain't big enough for both of us." In *Strange Divisions & Alien Territories: The Sub-Genres of Science Fiction*, edited by Kenneth Brooks, 12–25. Palgrave Macmillan, 2012.

Rivera, Lysa M. "Labor Imaginaries in Samuel Delany's *Nova*." *Canadian Review of American Studies* 50, no. 10 (Summer 2020): 241–56.

Smith, Bradon. "Imagined Energy Futures in Contemporary Speculative Fictions." *Resilience: A Journal of the Environmental Humanities* 6, nos. 2–3 (Spring-Fall 2019): 136–54.

Szeman, Imre. "Literature and Energy Futures." *PMLA* 126, no. 2 (March 2011): 323–5.

---. "System Failure: Oil, Futurity, and the Anticipation of Disaster." *South Atlantic Quarterly* 106, no. 4 (Fall 2007): 805–23.

Wills, David. *Prosthesis*. Stanford UP, 1995.

Zisk, Craig, dir. Matt Wolpert & Ben Nedivi, writers. *For All Mankind*. Season 3, episode 10, "Stranger in a Strange Land." Aired Aug. 12, 2022 on Apple TV.