

# Forms of Life

## *Thinking Fossil Infrastructure and Its Narrative Grammar*

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Bridges, roads, and buildings live longer than most humans and promise to continue to matter after our death.

—Hannah Appel, Nikhil Anand, and Akhil Gupta, “Introduction: Temporality, Politics, and the Promise of Infrastructure”

This essay aims to think energy infrastructure *as* infrastructure, in conversation with the burgeoning study of infrastructure in anthropology and science and technology studies (STS). My previous scholarship in energy humanities has touched on such matters as oil pipelines and electricity pylons, drilling rigs and substations.<sup>1</sup> Yet my attention to these infrastructural elements has focused more on the role of *energy* (particularly oil) in everyday life, cultural imagining, and political economy, than on what infrastructure is and does. It isn't quite right to say that I took infrastructure as “mundane to the point of boredom,” as infrastructure theorist Susan Leigh Star famously wrote in 1999, but its status as infrastructure remained subordinate to other questions.<sup>2</sup> As it turns out, this subordinate, background status is one important aspect of what infrastructure is and does: when its ordering, provisioning, and circulatory functions are working optimally, they often recede from social attention. This notion of well-functioning infrastructure as humming along, quietly unnoticed in the background, has been a key idea in infrastructure studies, whose influence is evident both in Star's seminal “call to study boring things” and in multiple subsequent challenges and revisions to what has become known as the “invisibility” thesis, an idea to which I will return.<sup>3</sup>

Star urged her fellow anthropologists to turn what could be understood as a *literary* eye toward infrastructure: “to unearth the dramas”

in infrastructural design and “to restore narrative to what appears to be dead lists.”<sup>4</sup> This call has been heeded in subsequent ethnographic work that excavates provocative questions regarding matter and metaphor, publics and politics, futures and failures, thereby attending to infrastructure’s simultaneous “conceptual plasticity and . . . undeniable materiality.”<sup>5</sup> That is to say, recent anthropological work in critical infrastructure studies is deeply suggestive for literary critics because its insights about the work of the imagination in the world, and about the temporalities and trajectories implied in infrastructure’s “promise” (to cite the title of a recent collection), are at once familiar and startlingly new. In what follows, I endeavor to think infrastructure through a kind of (inter)disciplinary bridgework by pushing these insights further; I bring my expertise as a literary critic and student of narrative to infrastructural questions in energy humanities. Thus, as I ask later in this essay, what would a narrative theory of infrastructure look like?

Rather than merely applying social science concepts to literary analysis, this essay examines both infrastructure theory and literary and visual texts in order to understand what it means to think infrastructure as a form of life. By “form of life,” I mean several things. One is the organization of collective social and political life that is mutually constituted with infrastructure, or obstructed by its failures and exclusions: forms of life as modes of living gathered around infrastructure, or, following AbdouMalik Simone’s idea of “people as infrastructure,” modes of living *as* infrastructure. Both ethnography and literature offer glimpses of the rhythms and textures of living with, *or without*, infrastructure. At the scale of the nation-state, given the visions of modernity and the sense of arrival often associated with monumental and highly visible infrastructure projects, one might ask how bridges, tunnels, roads, and dams compare with novels and newspapers (in Benedict Anderson’s paradigm) as vehicles for imagining national community or producing the state.<sup>6</sup> (Beyond the Andersonian framework, one might also ask how the relations and politics that constellate around infrastructure exceed or emerge at odds with the nation-state, most obviously in the relations between transnational corporations and subnational communities.) Another sense of “form of life” that I pursue here involves the agency or vitality imputed to infrastructure itself. What does it mean to contend with the “life” of infrastructure, as akin to organic, living things? This question is both semantic and substantive. A dead metaphor lurks within commonplace locutions that ascribe a “lifespan” to infrastructure, as Appel, Anand, and Gupta do in my epigraph above.<sup>7</sup> Plumbing some of the implications of this metaphor has been a task of infrastructure studies that draws on new materialist and multispecies modes of analysis. Yet I also examine the singular capacities of cultural objects, including literary fiction, photographs,

and film, to reckon more radically with infrastructure as a lifeform. My broad interest in thinking infrastructure as a literary critic is with the relation between these multiple infrastructural forms of life and the aesthetic forms of visual culture and narrative, including what I'm calling the narrative grammar of infrastructure.

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Two concepts in energy humanities that are relevant to thinking infrastructure are transition and impasse. *Transition* refers to the social, cultural, economic, political, and technological processes involved in a society transitioning from one predominant fuel source to another—say, the shift from wood and whale oil to coal and kerosene in nineteenth-century United States or the planetary imperative to shift from energy systems built around fossil fuels to renewables and greener energy sources today. This multifaceted sense of transition posits fuels not as neutral inputs easily and entirely substituted for one another during an energy transition conceived in exclusively technocratic terms but instead as *things* around which particular forms of life and social imaginaries constellate. Indeed, past examples of energy transition suggest that new sources tend to be *added* to an energy mix rather than entirely replacing existing ones in a stadial progression of fuels. But new (and newly dominant) fuels also bring with them broader changes and relations and thus could be said to entail a transition from one form of life to another, when “form of life” is construed as the organization of collective social life, economic production, and political deliberation: the forms of relation associated with particular fuels. *Impasse* refers to the immobilizing sociopolitical predicaments of the present: that is, everything in petromodernity that stands in the way of energy transition. As the petrocritic Imre Szeman writes, *impasse* means that we know where we stand with regard to energy and environment but we are unable to take the necessary action.<sup>8</sup>

An unremarked ambivalence about infrastructure in the energy humanities has important implications for these issues of transition and impasse. On the one hand, *making infrastructure visible* is regarded by scholars like historian Matthew Huber as a necessary (if insufficient) task in creating broader public understanding of the importance of energy and energy systems, which, *for those who inhabit energy abundance*, tend to be taken for granted. This task of rendering things visible is analogous to defetishizing the commodity; it also might be described as something like “following the pipeline” (an infrastructural corollary to “following the money”)—an idea to which I'll return. On the other hand, scholars like anthropologist Dominic Boyer point to the extant infrastructure of fossil fuels as a formidable obstacle to the imperative of energy transition. This concern ranges beyond the inertia of built environments and sunk costs to the very ubiq-

uity, saturation, and everyday normalized spectacle of the infrastructure of fossil fuels. Just *imagine*, if you will, that all the world is the frenetically banal highway interchange captured in Edward Burtynsky's *Breezewood, Pennsylvania*—staring us in the face as an obstacle to transition, whether we benefit from its affordances or not. To transpose Coleridge's "Rime of the Ancient Mariner" into a sort of "Rime of the Fossil Fuel": "infrastructure everywhere, and no alternative (or exit-ramp) in sight."

In brief, the contradiction regarding infrastructure in energy humanities is this: for some, it's the *invisibility* of fossil infrastructure that stands in the way of transition; for others, it's the *ubiquity* and inescapability of fossil infrastructure that is the challenge. And for many, it's the multiple forms of *exclusion* from fossil infrastructure and its benefits that demand a *just* transition. Yet the more we look around at gas stations and freeways and unwalkable neighborhoods and unventilatable buildings and digitalized everything, the more that possible alternatives seem impossible or recede from view. The more stuck we tend to feel.<sup>9</sup>

I don't mean to suggest that this contradiction is irresolvable; like most contradictions, it's two sides of the same coin. No matter how it lands, it lands in impasse. What interests me here is how this contradiction seems to revolve around questions of visibility and invisibility, which are wrapped up in modes of cultural imagining, forms of representation, and habits of ideological blindness or disregard that literary and cultural critics are well positioned to interpret. (Among these habits is arguably the invisibility thesis itself, given that the vast majority of the world's inhabitants cannot afford to take infrastructure for granted.) Furthermore, the visibility of fossil infrastructure is closely related to similar questions about oil, which, as I have written elsewhere, "is everywhere and nowhere, indispensable yet largely unapprehended, not so much invisible as unseen."<sup>10</sup> Yet oil (and its effects) elude representation and perception in a different way than highways, gas stations, or pipelines, whose "undeniable materiality" poses a more obdurate obstacle to abstraction or the withdrawal of attention.<sup>11</sup> In this sense, infrastructure offers a way of homing in on the particular dynamics and relations at work in the distribution of the sensible and the regimes of perception associated with petromodernity. As Arjun Appadurai notes, summarizing and reframing an important strand in recent scholarship, "to study infrastructure is, in truth, to study the technologies and techniques through which the visible and the invisible are separated, connected, and managed in the social life of cities."<sup>12</sup> In the realm of everyday life (as opposed to social theory), Appadurai argues, good infrastructure *is* invisible infrastructure; the literal and figurative making invisible of infrastructure through both topographical concealment and reliable functioning is the "single biggest shared property of what we may call the urban civilizing process."<sup>13</sup>

My work in energy humanities has taken a somewhat different tack in tracing the different ways of looking at a pipeline. In 2017, I attended the annual convention of the Pipeline Safety Trust, whose yearly meeting brings together US oil and gas pipeline industry representatives, government regulators, and interested members of the public (i.e., private landowners and Indigenous people who have incurred losses because of pipelines on or near their land). I spoke on the first-ever energy humanities panel at the Pipeline Safety Trust, a venue that posed a double challenge of (1) doing energy humanities as public humanities and (2) doing so for an audience partly characterized not only by its uncertain interest in and understanding of the humanities but also by its definite *financial* interest and ideological stake in fossil fuels. In my paper, “(Not) Seeing Oil, Imagining Risk,” I argued that one common way of seeing oil (for those who inhabit energy abundance) is actually *not seeing* it—taking it for granted. I talked about the work of artist Mishka Henner, who searches Google Earth to find and compose images like this one, of the Cedar Point Oil Field near Houston (see fig. 1).

Henner’s way of looking at the ways that satellites look at the earth is an aesthetic and political act. The beauty of this image has to do with scale, point of view, and abstraction. The contrasting colors and delicate shapes of fossil infrastructure and its environs come into view only from an extreme distance, the view from space, which is in turn facilitated by infrastructure. To be close up, on the ground or in the water, embedded and embodied within this place, would not be so lovely (see fig. 2). In other words, *what and how you see depend on where you stand*.

For my PST audience of regulators, industry reps, and angry “stakeholders,” I followed this brief aesthetics lesson in position, perspective, and modes of looking—how we learn to see, what not to see, and from what vantage point—with a discussion of visual composition and the relation between figure and ground. In aesthetic terms, “ground” is the element of an image that functions as context and remains static and inert; it’s the background for the *real, dynamic* object of interest called the “figure.” (Think of optical illusions like those that depict either human faces in black silhouette, or a white vase, depending on which color the eye perceives as figure, and which it perceives as ground.) Standing in front of a PowerPoint photomontage of aboveground pipelines coursing through neighborhoods in the Niger Delta, I asked: what is figure and what is ground, people or pipelines? And how does the answer to that question depend on one’s relationship to place and pipeline? Everyone hopes that a pipeline can remain as ground—static and stable—and not become the figure, the object of interest, the thing that happens. Yet consider the differences between such photos, on the one hand, and maps or charts that depict in an abstracted mode the totality of the infrastructure comprising

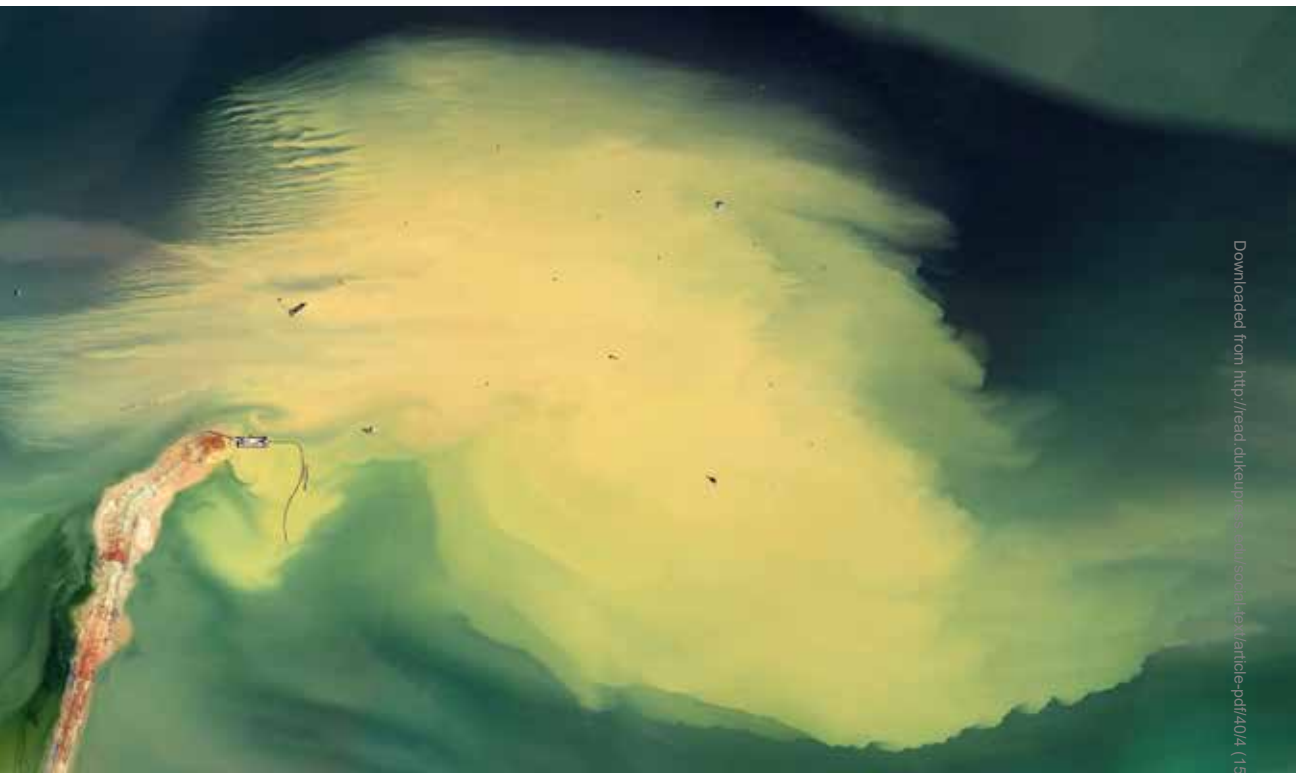


Figure 1. Cedar Point Oil Field, Texas, 2013–14.



Figure 2. Cedar Point Oil Field, Texas, 2013–14, detail.

drill sites, pipelines, and export terminals in the Niger Delta, on the other. Pipelines are not to be measured merely in the number of miles between a drill site and an export terminal along which something might go wrong but hopefully won't. Instead, for those who live along a particular section of pipeline, it might as well be their entire world. "Following the pipeline" can name a gesture akin to commodity defetishization, then, tracing the

social and geographical relationships between extraction and consumption. But the imperative to follow the pipeline could chart another sort of polity and map, not of counties and provinces, states and countries, but instead of vernacular habitations: linear communities joined by life along the pipeline. Such links that constellate around fossil infrastructure might yield “a real solidarity—a material solidarity—cutting across the territories that unite and divide us”; the act of mapping pipelines can be a prelude to disrupting flows of oil.<sup>14</sup> These figure/ground reversals have the potential to flip the script regarding how pipelines are understood in terms of proximity and relations of power.

For the Pipeline Safety Trust audience, these conceptual tools of scale, perspective, and figure and ground served as an invitation to think differently about looking at a pipeline.<sup>15</sup> In other words, the figure-ground relation offered another way of thinking, or visualizing, infrastructure. When I subsequently turned to reading scholarship on infrastructure in earnest, a strange mix of satisfaction and deflation met the recognition that this approach was something like Infrastructure Studies 101, following Geoffrey C. Bowker’s seminal insight about what he called “infrastructural inversion,” in which infrastructures cease to be taken for granted as “invisible backdrops to social action.”<sup>16</sup> Instead, they are rendered visible—as objects of concern—precisely by means of what Bowker described as a figure-ground reversal. Infrastructural inversion—infrastructure flickering into visibility and regard—can occur both in the lived experience of infrastructural interruption or failure, and as a methodological shift for scholars thinking infrastructure in a new way. (Susan Leigh Star’s argument about infrastructure as “boring” frames the same problem in different terms.) By attending to its “silent, unnoticed work,”<sup>17</sup> scholars have shown infrastructure to be dynamic, processual, and transitive: it makes things happen. This approach thinks infrastructure as narrative, a literary critic might say. Yet it would be a mistake to understand infrastructural inversion simply as “making infrastructure visible,” in an on/off, either/or, binary sort of way: now you see the pipeline, now you don’t. This was my point at the Pipeline Safety Trust conference. Whether understood as a regime of visibility, the gathering of a pipeline public or polity, or an invitation to a particular promise of futurity, infrastructure cannot be invisible to those charged with its maintenance and repair (like the industry folks at the Pipeline Safety Trust), and certainly not for marginalized communities consigned to inhabit a state of intimate disconnect—a form of life that entails living in close proximity to infrastructure while at the same time disconnected (or excluded) from its circulatory systems.

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The technosphere, although clearly currently mediated through human agency, has a dynamic of its own, and cannot be said to be under any central human control.

—Jan Zalasiewicz et al., “Technofossil Record of Humans”

In narrative terms, the relationship between figure and ground is roughly analogous to that between character and setting. Like ground, setting has conventionally been understood as the stable backdrop against which plot, or the actions of characters, unfolds. This relationship (and its instability) is arguably the most crucial narrative question of our time, given the myriad challenges posed by the Anthropocene, new materialisms, and their attendant paradigm shifts. Who or what can be a protagonist in a narrative? As I wrote in *The Disposition of Nature*, “what happens to narrative when setting becomes character, plot becomes setting, objects become subjects? When agency (i.e., the capacity to be a protagonist) is distributed across human and nonhuman entities? When the relationship between cause and effect (i.e., the foundation of plot) is dilated across vast spans of space and time (i.e., the dimensions of setting)?”<sup>18</sup> These narrative questions have important implications for infrastructure and its forms of life, as is evident, say, in Jane Bennett’s influential account of the US electrical grid as assemblage. I certainly share concerns that Bennett’s version of “political ecology” might vitiate actually existing politics by letting human and corporate agents off the hook for malfeasance and harm; in effect, her account of assemblage inverts the invisibility thesis because the culpability of *human* actors and intra-human stratifications of power recede from social attention. But I also want to emphasize a specifically disciplinary rift regarding infrastructure as agentive matter, a form of life.

I must confess to an additional disappointment upon reading Bennett’s *Vibrant Matter* because I had hoped that she would make me see matter as vital and blow my mind with the magic of agentive things. It didn’t work, I think, in part because what may seem imaginatively bold and inventive (if also politically quietist) coming from a political theorist seemed to me, as a professional lover of literature, rather leaden and ho-hum. Literature blows my mind every day. This is another way of saying that if we loosen the stranglehold that literary realism has gained on dominant understandings of what narrative is and does, we can see that the questions in the paragraph above are not entirely new. Beyond the regime of (bourgeois) realism, and even in its corners and shadows—in the realm of the literary imagination writ large—distributed agency and nonhuman protagonists are not newfound creatures discovered by an epochal paradigm shift from one ontology or materialism to another.<sup>19</sup> Personification is our stock-in-trade. Given this qualification, then, what would a narrative theory of infrastructure look like?

To begin an answer that question, I want to consider one of the ur-



texts of energy humanities, China Miéville's "Covehithe," a short story in which sunken oil platforms rise from the ocean floor and stumble onto land, wreaking havoc.<sup>20</sup> These rigs are a vivid fictional instantiation of the tendency of the human-created "technosphere" to elude human control. Toward the end of the story, readers discover that these terrifying infrastructural revenants—that is, creatures returned from the dead—are actually seeking, like sea turtles, a safe place onshore to lay and bury their eggs. An unlikely environmentalist movement, the "Oil Firsters," emerges to protect this new and endangered form of life, which we can also understand as "thinking infrastructure" in an adjectival sense: *what are these oil rigs thinking?* Although the story focuses on a human father-daughter pair who keep an illicit vigil in order to witness an oil rig return on the east coast of England, readers are made to understand that the habitat of this rig species is worldwide: the sunken rigs walk the sea floor and emerge thousands of miles away from where they sank. This weird tale breathes new life into the dead metaphor of infrastructural "lifespan," unsettling its "embedded strangeness,"<sup>21</sup> in order to pose new questions about the relationships among humans, nature, and infrastructure, and about the care, responsibility, and politics that such forms of life might demand.

"Covehithe" does not anthropomorphize infrastructure, nor merely personify it, but more precisely protagonizes it: the story depicts infrastructure as a protagonist that makes things happen in a narrative, and in the world. In terms of transition and impasse, these "revenant rigs" are new forms of undead (both "petrospectral" and "neonate") infrastructural life constellated around oil: an unfamiliar form of agency, a global phenomenon, perhaps even a movement,<sup>22</sup> that may obstruct energy transition in an entirely new way. Some might want a world after fossil fuels, but what if fossil infrastructure has a different future in mind? "In Miéville's fictional world, oil platforms cannot be abandoned, eliminated, or ignored," literary critics Polack and Farquharson conclude; anthropologist Hannah Appel observes that the offshore oil industry has "'abandonment issues,' which, by their nature, outlast the fact of the abandonment itself."<sup>23</sup> The abandoned rigs in "Covehithe" are "intransigen[t]," to borrow a descriptor from anthropologist Antina von Schnitzler's account of apartheid and its infrastructures in South Africa.<sup>24</sup> Miéville's depiction of rigs as a form of life both sexually reproductive *and* *revenant*, untethered from "lifespan" as conventionally understood, relocates to the realm of family romance Andreas Malm's account of fossil capital as underwriting "an economy of self-sustaining growth . . . a progress of growth that was not episodic, evanescent, broken off after a brief efflorescence, but persistent and unremitting, a secular progression propelled by its own inner forces."<sup>25</sup>

The capacities of literary fiction allow Miéville to situate his imag-

ined “revenant rigs” (and their self-sustaining intransigence) within a layered narrative comprising multiple timescales, historical trajectories, and processes of ruination, as well as several discordant registers of representation. The story’s title and geographic setting yoke this tale and these animate rigs to geologic time and its import for the present, although not (at least most immediately) in an Anthropocenic sense. The loose glacial sand cliffs of Covehithe, in Suffolk, are the site in the UK most threatened by coastal erosion, a process that jeopardizes the town itself, which is forecast to crumble away before this century ends. In Miéville’s story, this unsolid ground (“misbehavicious,” in the young girl’s description) compounds the danger of the vigil kept by the father, Dughan, and his daughter, who trespass in a securitized zone that is policed not only to protect people from unsound land but also to protect rigs (and riglets) from people (or vice versa?). Covehithe is a place where land is being reclaimed by sea, with the possibility of catastrophic collapse—a geological process that finds an inverse analogy in the story’s depiction of the fantastic rigs rising from their submergence and lumbering ashore. In effect, setting melts into plot, or at least its future horizons.

This dynamic of setting melting into plot is echoed, albeit with the historical trajectory reversed, in the story’s implicit comparison of fossil infrastructure with the curious history of Covehithe’s Saint Andrew’s Church, a large medieval church damaged in the English civil war. Unable to maintain the building (its windows destroyed during the war), the parish was granted permission in 1672 to demolish the roof and to build a more modest church within its walls, reusing some materials from the original structure. “Covehithe” ends with Dughan thinking about this palimpsestic site, the “stubby hall where services continued within the medieval carapace, remains of a grander church fallen apart to time and the civil war and to economics, fallen ultimately with permission.” This closing image indexes a structure of feeling—one of straitened circumstances, inhabiting the downsized new that nestles “inside the ruin of the old”—that is as much about the future as the past. The story invites comparison with the prospects of fossil infrastructure, particularly when we consider the infrastructural role of the church in medieval and early modern Europe as the organizing center of multiple circulatory systems. What would it mean for the grandeur and monumentality of fossil infrastructure to fall (or degrow) “with permission,” perhaps to be recycled for some chastened postcarbon future? Who (or what) has the authority to grant such permission or to intransigently refuse?

Juxtaposing the infrastructural predicaments of Christian early modernity with those of late petromodernity, “Covehithe” also invokes an older eschatology to speculate about what millennial future these rigs may have in mind. Before the reproductive purpose of their visitations is

understood, a new multilateral agency, the UN Platform Event Repulsion Unit, is constituted, bringing together “scientists, engineers, theologians and exorcists, soldiers . . . to decode this hydrocarbon Ragnarok. . . . They tried to figure out what economies of sacrifice were being invoked, for what was this punishment.” In Norse mythology, Ragnarok is a time of cataclysmic destruction, even of the gods themselves, in a flooded world that returns to a state of primordial void. One variant of the myth concludes with a new world rising from the waters to be populated by a lone surviving human pair. Bathic destruction, and possible re-creation: the multivalence of this mythic tradition resonates with the uncertainty of finding oneself living in a world in which infrastructure from the deep has resurfaced and taken on a life of its own. Dughan tells his daughter that “no one knows yet” what becomes of the baby rigs when they return to the sea.

Yet one of the most interesting aspects of “Covehithe” is that its speculative, weird, and mythic impulses are conjoined with an implicit documentary imperative. The story names ten revenant rigs: *Petrobras P-36*, *Rowan Gorilla I*, *Ocean Express*, *Key Biscayne*, *Sea Quest*, *Ocean Ranger*, *Interocean II*, *Sedco 135F*, *Ocean Prince*, and *Adriatic IV*. All of these, the inquisitive reader may discover, were *actual* rigs, sunk by accident or design: “ruined, lost, burnt, scuttled,” in the narrator’s words. Several of these rigs capsized in storms, some while being repositioned; a few suffered blowouts and catastrophic fires. The fates of all of them—and many more—are chronicled at “Oil Rig Disasters,” a matter-of-fact, bare-bones website that documented the fates of rigs lost to blowouts, structural collapse, and storms.<sup>26</sup>

Braiding together the narratives about actual sunken rigs recounted in *Oil Rig Disasters* with those sketched in “Covehithe,” I found that two aspects of the horror of Miéville’s story came into focus. First, the catastrophic harms to human life and marine ecosystems associated with the historical sinking of these rigs. My hunch is that the spectacular blowout of the BP *Deepwater Horizon* in 2010 sparked Miéville’s curiosity about distressed offshore rigs as forms of life and bringers of death, whether that of the ongoing catastrophe in the Gulf of Mexico or what “Covehithe” dubs “undistinguished disaster” of the *Rowan Gorilla I*, the first rig to return in the narrative; it capsized in a storm and sank in 1988. “Covehithe” is thus arguably an instance of what in Canadian parlance is known as “Research Creation,” artistic work that is the product of focused inquiry into matters of public or historical concern. Second, “Covehithe” indicates the worldwide scope and scale of offshore drilling. Within the story’s diegetic frame, underwater video footage captures sunken rigs walking the sea floor, which explains how rigs that sank in the North Sea or the Bay of Campeche or off the coast of Brazil resurface and walk

ashore in Portugal, the Galapagos, Sardinia, or Covehithe. “Revisitors might come, drill, go back to the water, even come up again, anywhere,” the narrator relates. The strange effect of Miéville’s weird tale is that it invites a glimpse of a planetary seabed *actually* littered with sunken rigs, a kind of global underwater archipelago of dead fossil infrastructure, one that is equally as chilling as their imagined resurrection. The planet’s oceans are full of these behemoths, both those still hard at work, and those fallen to the depths—waiting, perhaps, for their next form of life.<sup>27</sup>

Reading between “Covehithe” and Oil Rig Disasters got me thinking about literary intertextuality and its relationship to infrastructure. Two moments of negation in Miéville’s story are legible as deft gestures that hint at what *kind* of story “Covehithe” is by specifying what something is not. The narrator describes the scene of the vigil: the glinting moonlight, the lapping of the waves, and the song of “some insane bird, *not a nightingale*” (emphasis added). The nightingale is arguably the most literary of birds, making appearances in Ovid’s *Metamorphoses*, Pliny’s *Natural History*, Milton’s *Paradise Lost*, and Romantic lyrics by Coleridge and Shelley, to name but a few of its greatest hits. The “insane bird” in the story is not *that* bird, Miéville notes, pivoting away from literary tradition.<sup>28</sup> In a similar moment, when Dughan and his daughter encounter the “roofless ruin” of Saint Andrew’s Church, we read that “there was nothing at all frightening about the graves.” The story broaches the territory of the gothic literary mode, only to veer away from it. These allusive gestures—even in their negations—suggest how literary intertextuality is akin to infrastructure, in its ordering, ground-laying capacity. Motifs like the nightingale and the conventions of genres or modes like the gothic are infrastructural frameworks for composition and interpretation: they are pathways (or parameters, grooves) that order the ground for the circulation of meaning. (In cognitive terms, they’re something like neural pathways.) This is another way of saying that literary *form* itself is a form of life. Even the rather prosaic Oil Rig Disasters website offers a taxonomy of disaster’s causes (blowouts, collapse, sunken rigs, hurricanes) and effects (deadliest, most expensive).

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The most suggestive intertextual gesture in “Covehithe” (at least for this middle-aged North American reader) is its tacit invocation of “Search in the Deep,” an episode of *The Undersea World of Jacques Cousteau* that first aired in 1968 but was reprised multiple times during rainy recess periods or movie days at my elementary school in the mid-1970s. This episode depicts the strenuous efforts of female green sea turtles (*Chelonia mydas*) who beach themselves and drag their massive shells through the sand in order to dig out nests in which to bury their eggs. (Then, as now, it’s the tears mixed

with sand accumulating under the females' eyes that grab me as the index of their labors.) The baby turtles hatch sometime later—at night if they're lucky, otherwise they become lunch for the frigate birds inevitably circling overhead. Thanks to Jacques Cousteau's subsurface magic, the episode also features an underwater sequence in which the "lady" turtle is locked in coitus with a male. And to think that I saw it in elementary school!

Miéville is too subtle to name Cousteau. But the narrator describes a "drill ovipositor injecting slippy black rig eggs into England," as well as "the first clutch of newly-hatched oil rigs [that] had unburied themselves." (Conversely, in "Search in the Deep," Cousteau relates that a turtle's "hind flippers begin to drill a cylindrical well" in which to deposit her eggs.) The Cousteau connection makes a different kind of sense out of a paragraph in "Covehithe" about rig sex: "the strange prurience that endlessly turned on monoliths rutting miles down. An inhuman pornography of great slams and grinding, horrified whales veering from where one rig mounted another." Beyond these local details that borrow the reproductive behaviors of green sea turtles to imagine the return of decommissioned oil rigs, Miéville draws on the broader notions of wonder, curiosity, and exploration as a mode of ocean stewardship that made Jacques Cousteau an agent and icon of environmental awakening in the late 1960s and early 1970s. The aforementioned "Oil Firsters" in Miéville's story are a radical, newfangled variant of such (petro-)environmentalism, ready to kill "all those who came to investigate or exploit, in their parlance, the visitations." But there are also "colouring books" and "kids' clubs" to interpellate young children into more mainstream modes of care and concern for the rigs; the clubs gather to watch livestream video from within the nests. "You've seen films," Dughan replies when his daughter asks him how big the hatched riglets are. They have their own Cousteau.

What made Jacques Cousteau a household name was that his technological innovations in undersea exploration were combined with an interest in photography and other forms of mediation, a nexus that facilitated what James Cahill aptly dubs "*periscopophilia*, born of an intense desire to see and act upon previously inaccessible worlds."<sup>29</sup> The Aqua-Lung, a precursor of scuba gear that Cousteau invented in the early 1940s, allowed him to witness the ocean depths, while his books, magazine articles, films, and television shows (shot with water- and depth-proof cameras) allowed armchair divers to see what he saw. In *Living Oil: Petroleum Culture in Twentieth Century America*, Stephanie LeMenager points to Cousteau and Rachel Carson as figures who "reintroduced the ocean to middle-class and affluent Americans" in the mid-twentieth century.<sup>30</sup> Carson's *The Sea Around Us* (1951) closes with a relatively untroubled account of ocean mining and the prospect of deep sea oil extraction, about whose environmental consequences, LeMenager remarks, Carson was "at once prescient

and terrifically blind” at that point in her career (*Living Oil*, 50). Cousteau’s career, however, was directly entangled with the oil industry—a fact that is at once surprising, given Cousteau’s later status as environmental icon, and utterly unsurprising, given the technological challenges shared by oil company prospectors and chroniclers of marine life. “The symbolic work done in the name of ‘the ocean’ has never been unmixed in its attunement both to its interspecies relationships and to the military and industrial technologies that assist human knowledge of ocean depths,” LeMenager writes (*Living Oil*, 50).

These technologies played a multivalent role in Cousteau’s career. The sine qua non of Cousteau’s relationship to the ocean was his Aqua-Lung, developed in collaboration with French engineer Émile Gagnan. In the midst of a wartime gasoline shortage in France, Gagnan had created a demand-valve regulator that enabled cooking gas to fuel automobiles; working with Cousteau in the early 1940s, he adapted the device to adjust the pressure in compressed air tanks that would allow divers to move freely while breathing underwater.<sup>31</sup> A decade later, it was Cousteau’s expertise in underwater exploration that the oil industry sought to draw on. In 1953, Cousteau and his *Calypso* were commissioned by a subsidiary of Anglo-Iranian (soon to be renamed British Petroleum) to survey a concession off the coast of Abu Dhabi; the work consisted of taking various measurements and collecting samples from the seafloor. Impressed with Cousteau’s invention of scuba diving as recounted in his book *The Silent World* (1953), company geologists thought that Cousteau’s methods might be effective (and cost-effective) in determining whether and where to drill.<sup>32</sup> The work was documented in *Station 307* (1954), a short black-and-white film sponsored by British Petroleum and shot by a young Louis Malle, whom Cousteau had invited on the expedition and trained in using the Aqua-Lung. What stands out in *Station 307* is its technophilia; the film lavishes attention on the various low- and high-tech instruments that will help geologists discern where oil might lie. Marine life, by contrast, figures almost exclusively as a nuisance: sharks, coral, and poisonous sea snakes pose a threat to the divers or the ship. The sea creatures that the *Calypso* seeks on this voyage are fossilized ones, which would indicate oil deposits below. Nonetheless, Cousteau assures viewers that “today, as ever, diving gives us the same thrill,” even if the rest of the work at the mission’s four hundred survey stations seems an irksome combination of tedium and strain. *Station 307* depicts the expedition as historic: “For the first time, our diving methods will be used to assist in the search for oil. . . . These operations are the pioneering efforts of a new technique. They will find a place in the history of the oil industry,” Cousteau announces in his voice-over, in accord with British Petroleum’s proclamation in the film’s opening title of “a new chapter in the story of the search for oil.”

These claims for a technological revolution in oil exploration are somewhat overblown; Cousteau's survey work for British Petroleum was a one-off, and it's unclear exactly how determinative the dives from the *Calypso* were in pinpointing the successful drill site.<sup>33</sup> In 1958, the *ADMA Enterprise*, an innovative "jack-up" mobile drilling barge manufactured in Germany, struck oil in what became the Umm Shaif offshore oilfield, thereby confirming Abu Dhabi's status as a petrostate after two decades of exploration. Cousteau's work for British Petroleum was transformative in another sense, since he earned £45,000 for the ten-week contract—money that helped fund the continuation of the voyage.<sup>34</sup> For two expeditions through the Mediterranean, the Persian Gulf, the Red Sea, and the Indian Ocean, Louis Malle stayed aboard the *Calypso*. His color photos appear in Cousteau's 1955 *National Geographic* feature about the voyage, which opens with the oil survey work and gets on to more wondrous underwater and onshore sights, some of the latter recounted in what might be described as an Orientalist mode—perhaps an anxious trace of the anti-colonial agitation in the region that James Cahill reminds us of. Malle also worked with Cousteau to make *Le monde du silence* (1956), an underwater feature-length documentary film about the second voyage, shot in color, that won an Academy Award for Best Documentary Feature, as well as the Palme d'Or—the highest prize awarded at Cannes. In other words, while *Station 307* remains an obscure industrial film made for and under the sponsorship of British Petroleum, Cousteau's survey work for British Petroleum also facilitated the feature film that cemented his international fame. A visual index of that link is the shiny BP oil barrel featured in one scene of *Le monde du silence*.<sup>35</sup>

The *ADMA Enterprise* was sold and renamed the *Offshore Enterprise* in 1966;<sup>36</sup> its subsequent fate seems not to have been disastrous enough to merit inclusion on the Offshore Rig Disasters website. Cousteau would come in for criticism for his cavalier, even cruel treatment of marine life in *Le monde du silence*, particularly for a scripted whale versus shark versus *Calypso* encounter (also narrated in *National Geographic*) in which the prime directive seemed to be getting a good shot.<sup>37</sup> Even in *Station 307* there is a strong suggestion that the beleaguered divers turn their hammers against the sea snakes. In the 1950s, there were no now-obligatory disclaimers that no animals were harmed in the making of Cousteau's films—a stark contrast with his crew's interventions on behalf of wayward or trapped sea turtles in the later "Search in the Deep," which concludes with Cousteau acknowledging that their capture of turtles for study in Monaco "interfered" with and "upset the balance of nature," yet also explaining that humans have hunted the species nearly to extinction, "ruthlessly deplet[ing] the resources of the ocean." As LeMenager suggests with regard to Rachel Carson, the big-picture questions about off-

shore oil drilling that have become so pressing since the 1950s—either the danger to marine life from blasting, spills, and blowouts, or the acidification of the oceans caused by the combustion of fossil fuels—exceed the frame of Cousteau’s midcentury mediation of the ocean. Indeed, Carson’s glowing review of Cousteau’s 1953 book (written in part to capitalize on the success of Carson’s *The Sea Around Us* [1951]) ends by endorsing his vision of mining the oceans for resources, including petroleum.<sup>38</sup>

In June 2019, a team of twenty-first-century heirs to Cousteau’s pioneering endeavors captured nearly unprecedented video footage of a giant squid just a hundred miles from New Orleans—only the second time the elusive *Architeuthis* has been filmed swimming in deep water. (The only other video footage of a live giant squid was filmed in shallow waters off of Japan in 2015.) Both deep-ocean sightings were made by oceanographer Edith Widder’s Medusa camera, which dangles far from the research ship on a mile-long tether and uses a cluster of LED lights to mimic the bioluminescence of a jellyfish.<sup>39</sup> The squid was filmed while swimming 759 meters below the surface, near the *Appomattox*, Shell’s largest floating oil platform in the Gulf of Mexico. Duke University biologist and expedition leader Sönke Johnsen exclaimed, “Even just a hundred miles off the coast, we’re seeing things that they put on the corner of the maps—you know, ‘Here lie monsters.’ . . . You could be out here, and beneath you are giant squid, the things of our wildest imagination! They’re part of our land, they’re part of our country.”<sup>40</sup> This NOAA-funded expedition of the Research Vessel *Point Sur* did not report any strange subsurface movements of infrastructural forms of life.

The spatial paradox in Johnsen’s exclamation crystallizes some of the contradictory implications of “Covehithe,” with implications for infrastructure writ large. That is, what happens a mere hundred miles from land may as well happen at the cartographic edge of the known world, or in the largely unexplored frontier of “silent” ocean depths. In terms of public cognizance, how much difference is there, really, between operational (or cold-stacked) offshore rigs scattered across the ocean’s surface and defunct ones sunken and abandoned to the deep? Rendered as a transitive verb rather than an adjective, “to offshore” might therefore describe not only business practices of sequestering assets from taxation, company operations from regulatory attention, or manufacturing from relatively high labor costs but also a more general displacement of attention and regard.<sup>41</sup> Offshoring, in this sense, is an extreme example of infrastructure’s tendency to recede from view. As “Covehithe” suggests, to bring infrastructure back “onshore” is necessary, yet complex and unpredictable in its effects.

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Infrastructures have no heroes.

—Hannah Appel, Nikhil Anand, and Akhil Gupta, “Introduction: Temporality, Politics, and the Promise of Infrastructure”

I would extrapolate from Miéville’s story some broader thoughts about the transitivity of infrastructure, its relation to temporality, and its narrative grammar. Social scientists have described multiple aspects of infrastructural time: its developmental promises of a future perfect, or alternative visions of futurity, and their inevitable deferral or suspension; the persistence and duration of infrastructure, either through the slow ruin of abandonment, or the present continuous of iteration and maintenance; and the punctuating events of interruption or failure.<sup>42</sup> But the derangement of realism in “Covehithe”—the story’s surreal depiction of these actual sunken rigs—points toward different notions of narrative time and what constitutes an infrastructural event. Thinking about infrastructure writ large, what do nuclear cooling towers, electric pylons, railways or oil-drilling rigs make happen (or keep from happening), both socially and narratively, either when they “work,” when they’re hacked, when they fail, or—in the case of “Covehithe”—when they develop a mind (and offspring) of their own?

In other words, infrastructure is transitive in multiple ways simultaneously. If we accept for a moment the debatable proposition that there is something unheroic about infrastructure,<sup>43</sup> then what *is* the fundamental relationship between infrastructure and narrative? Even when not vividly protagonized as in “Covehithe,” infrastructure makes things happen: sometimes by design (i.e., it does what it was designed to do); sometimes in excess of design (i.e., its spatial, social, environmental, subjective, cultural, political effects may exceed its ostensible purpose; people might hang their laundry on it); and sometimes at complete odds with design. More precisely, infrastructure can be understood as the enabling condition for transitivity. Glossing Brian Larkin’s seminal theorization of infrastructure, Dominic Boyer posits that infrastructure is fundamentally “that which allows something to happen. . . . Whatever else an infrastructure might be it must always serve as the foundation that enables something else to happen. . . . What do infrastructures do? They enable.”<sup>44</sup> For Boyer, infrastructure is “modal,” which we can gloss in grammatical terms as the can-do (or, in cases of failure, interruption, exclusion, or intransigence, *can’t-do*) auxiliary to another verb. Infrastructure “creates the grounds on which other objects operate.”<sup>45</sup> The paradox of this enabling, auxiliary function is that the transitivity of infrastructure recedes from view in the wake of the actions that it enables.

In narrative terms, the normative, well-functioning, “boring” aspects of infrastructure that can lead it to be understood as “invisible” or “silent”

in the first place are a paradoxical sort of *transitivity without event*. In other words, well-functioning infrastructure enables and makes things happen, but the iteration of that enabling and happening is smoothed out and effaced into nonevent: the normality of noninterruption, good service, strong signal, “nothing happening.”<sup>46</sup> Plot becomes setting. Of course, well-functioning infrastructure is itself a kind of fiction, an unfulfilled promise, and I make these claims at the level of a narrative grammar of infrastructure, not on an empirical basis. Nonetheless, from the perspective of energy humanities, this transitivity-without-event is another way of understanding the contradictions of impasse. How many far-flung small events—extraction here, refinement there, combustion there—must combine in order to yield the received normality of petromodernity, “nothing happening.” *How much has to happen for nothing to happen?*

• • •

I want to make two points by way of conclusion:

The first point is about “fossil infrastructure,” a phrase I use matter-of-factly throughout this chapter to denote infrastructure that directly supports the extraction, refinement, distribution, and combustion of fossil fuels, as well as other types of infrastructure for which coal, natural gas, oil, and petrochemicals are either a major energy source or feedstock. But I want to probe further the suggestiveness of the term, which inheres in the echoes and tensions among its multiple possible meanings and registers. Proximate to this literal sense of *fossil infrastructure* is infrastructure *paid for* with revenues from fossil fuel extraction.

Examples of such fossil-funded infrastructure can vary widely, ranging from places like, say, twenty-first-century Equatorial Guinea, where an infrastructure boom offers “a method to launder petrodollars,”<sup>47</sup> to the United States in the mid-twentieth century, when Keynesian debt-driven investments in social welfare and infrastructural development (think large dams and interstate highways) as a path to economic growth were premised specifically on US control of oil in the Middle East, and more broadly on notions of oil as an unlimited resource.<sup>48</sup> This public investment underwrote the proliferation of suburbs premised on the automobile, an American dream (and nightmare) that was part of the mid-twentieth-century model of development exported to the rest of the world.<sup>49</sup> Fossil-fueled assumptions of unlimited cheap and easy energy yielded what Imre Szeman has called “fictions of surplus.”<sup>50</sup> Might we, then, understand the material counterpart of such ideological fictions as *infrastructures of surplus*? Recalling these “halcyon years of Keynesian carbon modernity,” Boyer’s periodizing argument helps to account for the increasing sense of infrastructural decline in the United States.<sup>51</sup> After decades of neoliberal infrastructural neglect, the United States is now living off the meta-

phorical fumes of that earlier moment, even as its literal exhaust, in the form of greenhouse gas emissions, promises a radically different future for the planet as a whole. These shifting circumstances and disparate temporal horizons (deepwater horizons?) point to another set of meanings for *fossil infrastructure*: a temporal or normative descriptor of infrastructure deemed to be archaic, anachronistic, or obsolete—a dinosaur, if you will. Recasting its stuckness in ideological terms, Timothy Clark aptly describes the infrastructure of fossil fuels as “denial in concrete.”<sup>52</sup>

A related sense of *fossil infrastructure*—both material and metaphorical—might describe the waste material of decommissioned, discarded, abandoned, “dead” infrastructure. Some scholars have described this stuff as “urks,” an abbreviation of *urkopplad*, which means “disconnected” in Swedish.<sup>53</sup> *Fossil infrastructure* in this sense evokes fossils in their geologic, stratigraphic aspect, and therefore denotes material predicaments of waste and the geological aspects of landfilling and waste mining. To the extent that geologists and archaeologists have taught us to read the passage of time in the accumulation of sediment and layers of rock (where deepest is oldest), this chronostratigraphic version of fossil infrastructure imagines what a cross-section or core sample of history figured as a series of iconic infrastructures might look like—even as scholars of infrastructure have challenged such stadial notions of history.<sup>54</sup> New kinds of infrastructure are often installed within older ones—goat paths become roads become highways; fiber optic cable follows telegraph or telephone cable. And the imperative of energy transition in the present must reckon with a history of energy use characterized by “stacking” and simultaneity: as noted earlier, new fuel sources tend to be *added* to extant energy systems rather than completely replacing older ones. Aside from these macro-level tendencies, a different orientation toward fossil infrastructure might be found in Steven Jackson’s “broken world thinking” injunction to refuse the new and embrace reuse and repair.<sup>55</sup> As Appel, Anand, and Gupta ask in *The Promise of Infrastructure*, “What kinds of futures and future politics will today’s infrastructures leave behind? What are the dreams that may be gathered in its rubble?”<sup>56</sup> China Miéville’s account of fossil infrastructure in “Covehithe” offers one answer to these questions.

The second point to conclude my discussion of thinking infrastructure is about forms of thinking that are themselves infrastructural. In her seminal provocation, “The Ethnography of Infrastructure,” Susan Leigh Star warned, “Study a city and neglect its sewers and power supplies (as many have), and you miss essential aspects of distributional justice and planning power.”<sup>57</sup> We might read this observation as an exhortation to “invert” infrastructure, to take its transitivity seriously; in the essay, it supports Star’s argument for “‘study[ing] the unstudied’” or the ostensibly “boring.”<sup>58</sup> But the syntactic *form* of this much-cited exhortation offers

a useful template: study x and neglect y and you miss z. Indeed, Star herself uses the exhortation in just this way; her next sentence reads, “Study an information system and neglect its standards, wires, and settings, and you miss equally essential aspects of aesthetics, justice, and change.”<sup>59</sup> Star’s essay is about databases, not about Paris. She borrows the syntax and logic of the conclusion that she draws from Bruno Latour and Emilie Hermant’s *Paris ville invisible*. Notice how the sentence-template (which we might roughly call a *grammar*) is, even in its original context, *infrastructural*: in Bourdieu’s terms, a “structuring structure” for the circulation of thought; a structure that, as the modal hinge between intransitive and transitive, *allows things to happen*. (Try it with your students when they struggle to find an argument: study x and neglect y and you miss z.) So, for example, “Study infrastructure and neglect its perspectival or semi-otic or narrative complexity, and what do you miss?” Or, “Study literature and neglect its myriad imbrications with infrastructure (e.g., its material embeddedness in literary sociology and circulation; its imaginative work in ground-laying processes of ‘infrastructuring’ or ‘infrastructural inversion’; its thematic representation (or elision) in shaping infrastructural imaginaries)—and what do you miss?”

As a beginning on the second question, I want to seize on the etymology of the word *infrastructure*—with the prefix *infra-* denoting what is beneath, behind, or within—in order to resist the turn in literary studies toward surfaces and away from depths, whether geologic or psychic. I have in mind the turn toward “surface reading,” description, “just reading,” and the disavowal of symptomatic reading and ideology critique.<sup>60</sup> Taken together, these trends point to a quarantine of literature from history and politics.<sup>61</sup> What the ethnography of infrastructure makes clear is that relations of surface and depth, infrastructure and superstructure, are invariably tied up with historically dynamic relationships between private property and what used to be called “public works,” and more broadly with imperialism, “improvement,” and accumulation by dispossession.<sup>62</sup> As with fossil fuels, one can hardly study infrastructure without peering beneath (before) the surfaces of the present. These historical and spatial relations are at work in the earliest uses of the term; in nineteenth-century French railroad construction projects, “the infrastructural portion of a project (below/before) was built by the state and the superstructure (above/after) constructed by private contractors.”<sup>63</sup> This below/before relation is inherent to infrastructure’s enabling function (even if one of the things that this public infrastructural “improvement” tends to enable is bourgeois private property regimes). Making explicit the historical depths implied in the *infra-*, Gregg Hetherington writes that “infrastructure is, of course, that part of an assemblage which fades into the background and which enables the foregrounding of other parts. But it is also, by exten-

sion, that which comes before something else, that which lays the conditions for the emergence of another order.”<sup>64</sup> These fundamental ideas about the historicity of infrastructure and its legibility have import for the conceptual bridgework with energy humanities and literary studies that I have attempted in this essay. As Brian Larkin writes in his indispensable discussion of the poetics of infrastructure, “The political effects of [infrastructural] projects cannot be simply read off from their surfaces.”<sup>65</sup> An infrastructural approach to literary study—concerned with what is beneath, behind, before—might demand an insistence on historical conditions of possibility and contested visions of futurity, and a reckoning of the relationship between forms of life and forms of narrative, with an eye toward energy justice and a world beyond fossil infrastructure.

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## Notes

1. See, esp., Wenzel, “Petro-Magic-Realism Revisited”; and Wenzel, “Aman-dla! Awethu!”
2. Star, “Ethnography,” 377.
3. See, inter alia, Larkin, “Politics.”
4. Star, “Ethnography,” 377.
5. Carse, “Keyword,” 35.
6. See, e.g., Anand, “Public,” esp. 158, 168.
7. Appel, Anand, and Gupta, introduction, 19.
8. Yaeger et al., “Editor’s Column,” 324.
9. In their most recent formulations of impasse, Mark Simpson and Imre Szeman theorize impasse as a form of stuckness; they observe that narratives of impasse and transition may in fact be a symptom of, and contribute to, the predicament of impasse.
10. Wenzel, introduction, 11.
11. Carse, “Keyword,” 31.
12. Appadurai, foreword, xiii.
13. Appadurai, foreword, xii. In effect, Appadurai posits the capacity to take infrastructure for granted—to see it as “boring” or even to not see it at all—as a political *aspiration*, thereby reframing much recent work on infrastructure (particularly in the Global South) that challenges the invisibility thesis. One might argue from any number of perspectives, however, that being able to not think about infrastructure is a form of complacency that can only bring further problems.
14. Tarr and Us-Sabah, “End.”
15. The Pipeline Safety Trust was created with \$400 million designated in a larger settlement following a fatal pipeline explosion in Bellingham, Washington. Attending the annual convention is one way that energy companies comply with

regulatory requirements for public engagement. Its decidedly mixed constituency quite literally having been convened by disaster, the fragmented membership of the PST itself evidences some disparate ways of looking at a pipeline.

16. Bowker, "Information Mythology"; Harvey, Jensen, and Morita, introduction, 3.

17. Harvey, Jensen, and Morita, introduction, 3.

18. Wenzel, *Disposition*, 19.

19. With the qualifier *bourgeois*, I mean to complicate Amitav Ghosh's well-known and influential arguments in *The Great Derangement* about the putative inability of fiction, or the unwillingness of fiction writers, to address climate change—or to address oil, as he wrote similarly a quarter century earlier in "Petrofiction." Distinguishing "serious" fiction from genre fiction, and extolling something he repeatedly calls the "mansion" or "manor house" of modern fiction, Ghosh's remarks about fiction fail to grapple with questions of class—an oversight that undermines his incisive reading of the ways that colonialism shaped energy and climate histories at a global scale.

20. I'm indebted to Fiona Polack and Danine Farquharson, whose reading of "Covehithe" was my first encounter with the story.

21. Star, "Ethnography," 379.

22. "Once chosen, a place might be visited by any one of the wild rigs that walked out of the abyss. As if such locations had been decided collectively" (Miéville, "Covehithe").

23. Polack and Farquharson, "Offshore Rig," 254; Appel, "Infrastructural Time," 56.

24. Van Schnitzler, "Infrastructure," 140.

25. Malm, *Fossil Capital*, 11.

26. "Oil Rig Disasters." This no-longer-available website chronicled disasters between 1956 and 2007. It featured a guestbook that allowed visitors to post questions, comments, and recollections about their experiences in the industry, and/or that of lost friends or family; some sought photos or information, while some offered it. A kind of community came into view, constellated around these "dead" and decommissioned infrastructural objects and the human lives shaped by them.

27. An interim state between surface operation and deep-sea abandonment is "cold stacking," rigs powered down yet still afloat: rusting, waiting. This is industry practice, not Miéville's imagination.

28. This tradition is potentially vast, given the analogous literary attention to the bulbul, an ornithologically distinct family of songbirds (*Pycnonotidae*), endemic to the Middle East, Africa, and South Asia, whose presence in Persian and Hindi/Urdu literature is equally vaunted as that of the nightingale in European literature.

29. Cahill, "Plurality," 7.

30. LeMenager, *Living Oil*, 49.

31. Morton, "Calypso," 7.

32. Morton, "Calypso," 9.

33. Morton, "Calypso," 23–24. The most useful data came not from the samples collected by divers but instead from the gravimeter, lowered to measure gravitational force at each of the four hundred stations. This data from the *Calypso* suggested where subsequent seismic testing should occur. Nonetheless, a later British Petroleum film commemorating the launch of the *ADMA Enterprise* oil platform at the site, mentions only that "teams of skin-divers had swum down into the depths, combing the seabed to bring back samples of rock" in its account of the location-scouting process (*ADMA for Short*, 1958). Cousteau's work is featured in *Chronicle*

of *Progress*, a year-by-year commemoration of the emergence of the United Arab Emirates (see photo series in the foreword).

34. Morton, "Calypso," 11.

35. The empty barrel is shown being lowered into a skiff, ostensibly to mark the site of the shipwreck explored in this long sequence of the film. The invocation of BP here closes the circle on the early phase of Cousteau's diving career, focused around the exploration of sunken ships and innovating methods for underwater archaeology, as chronicled in films like *Épaves* (1943) as well as *The Silent World*, the 1953 book said to have captured the attention of BP geologists. *Le monde du silence* also features a sequence about sea turtles' mating and egg-laying habits, framed as a story related to the crew by an inhabitant of what turns out not to be a desert island, that would be remade more than a decade later in "Search in the Deep."

36. Al Abed et al., "Chronicle."

37. The horror of the sequence of whale maiming and shark massacre in *Le monde du silence*, James Cahill emphasizes, derives particularly from the fact that it explicitly reprises and reenacts (i.e., *scripts*, with better camera angles) an earlier incident in 1954 when Cousteau and Malle had baited sharks into a frenzy with a baby whale tied to the ship, which appeared in their short color film *Calypso cap au Sud: Requins bleus et corail noir*. When *Le monde du silence* was prepared for rerelease in the 1980s, Cousteau argued for keeping this sequence as an index of shifting attitudes toward the environment (Cahill, "Plurality," 15, 20n43; Marchessault, *Ecstatic Worlds*, 82; Soulez, "Malle").

38. Carson concludes, "As Capt. Cousteau points out, in the future we must look to the sea, more and more, for food, minerals, petroleum. The aqualung is one vital step in the development of means to explore and utilize the sea's resources" ("Sea-Depths"). Cousteau's subsequent disavowal of this resource logic is evident in his 1960s and 1970s activism against French nuclear testing in the Pacific and a proposed shift in international law aimed to foster resource extraction from the seas.

39. Jarvis, "Giant Squid."

40. Jarvis, "Giant Squid."

41. Such was the collective conclusion, perhaps the motivating premise, of *Petrocultures III: The Offshore*, a conference organized by Polack and Farquharson at St. Johns, Newfoundland, in 2016.

42. See especially Larkin, "Politics"; Brennan, "Visionary Infrastructure"; Hetherington, "Waiting"; Appel, Anand, and Gupta, *Promise*.

43. Appel, Anand, and Gupta, introduction, 13.

44. Boyer, "Infrastructure," 226–27.

45. Larkin, "Politics," 329.

46. Akhil Gupta goes so far as to describe conventional, uninverted views of well-functioning infrastructure (described by other scholars as "boring" or "invisible") as occupying a "dead time, an inertial existence" ("Future," 73). Inertia is a suggestive way of thinking about this dynamic because of the tension between its colloquial and scientific meanings: immobile versus resisting change to its state of motion. In other words, I'd argue that the energy-intensive infrastructure of space-time compression creates its own inertia precisely through the mobilities that it enables. I'm less certain about Gupta's notion of the "social death" of infrastructure ("Future," 73), which for him occurs after the (often controversial) processes involved in its design, siting, and construction: infrastructure is socially "dead" precisely when it does what it was designed to do. Even though he sketches this idiosyncratic account of the life trajectory of infrastructure in order to argue for more fluid and less teleological views of infrastructural temporality, I'm troubled

by the unexamined echoes with Orlando Patterson's account (1982) of slavery as social death.

47. Appel, "Infrastructural Time," 48

48. Boyer, "Infrastructure"; Mitchell, *Carbon Democracy*.

49. Huber, *Life Blood*; Howe, "Headloading."

50. Yaeger et al., "Editor's Column," 324.

51. Boyer, "Infrastructure," 225.

52. Clark, *Ecocriticism*, 159.

53. Wallsten and Krook, "Urks."

54. See Appel, Anand, and Gupta, introduction, 9. Compare Zalasciewicz et al.'s argument that "technofossils"—fossilized remnants of human-made artifacts—are stratigraphically significant for their planet-wide distribution and their historical granularity.

55. Jackson, "Rethinking Repair."

56. Appel, Anand, and Gupta, "Introduction," 30.

57. Star, "The Ethnography of Infrastructure," 379.

58. Star, "The Ethnography of Infrastructure," 379, 377.

59. Star, "The Ethnography of Infrastructure," 379.

60. See Best and Marcus, "Surface Reading."

61. See Lesjak, "Reading Dialectically."

62. See Rubenstein, *Public Works*, a seminal account of the import of infrastructure for literary studies.

63. Carse, "Keyword," 30.

64. Hetherington, "Surveying," 40.

65. Larkin, "Politics," 334. This statement echoes the fundamental assumption behind infrastructural inversion: that infrastructures were not inert "surfaces from which social, cultural, or political motives could be decoded" (Harvey, Jensen, and Morita, *Infrastructures and Social Complexity*, 3).

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