# "The Stepping Stones of Empire": Conrad, Coal, and Oceanic Infrastructure

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IN his 2021 book *The Nutmeg's Curse: Parables for a Planet in Crisis*, Amitav Ghosh observes that the uneven distribution of fossil fuels across Earth "has been central to the emergence of the world's current geopolitical order," and he calls for more robust attention to geopolitics and empire among critics researching the history of fossil fuels and the climate crisis, remarking that the "discussion of climate change, as of every other aspect of the planetary crisis, tends to be dominated by the question of capitalism and other economic issues" despite the centrality of colonialism to industrial modernity.[1] Capitalism and colonialism are more inseparable than Ghosh's formulation suggests, but his comment reminds us that both fed on the milk of coal, nourished by the rise of steam power in the nineteenth century. In this essay we will take a geopolitical approach to the study of fossil-fueled society by examining Joseph Conrad's literary depictions of the proliferation of coal infrastructure in the Victorian maritime world. The material exigencies of fueling and refueling required the installation of coaling stations to support long-haul transport for steam-powered ships, and oceanic infrastructure was a new feature of the British Empire, especially in the period after 1860 when steamships were increasingly replacing sailing ships. With this analysis we hope to show the benefits of eschewing abstract conceptions of capitalism or colonialism as frames for global analysis and of focusing instead on the

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specific infrastructural, logistical, and environmental relations that constituted these forces.

In his former career as a sailor, Conrad observed firsthand the transition to steam in maritime transport. His depiction of nineteenth-century coaling stations and steamships in two of his works, *Victory* (1915) and *The Mirror of the Sea* (1906), demonstrates the historical significance of coaling stations and other fossil-fuel infrastructure in the Victorian maritime world and the ways in which this historic transformation would manifest in literature. Drawing on infrastructure studies, critical ocean studies, and the energy humanities, we will make a case in this essay for more attention to oceangoing coal as part of a broader reconsideration of the Victorian roots of the Anthropocene. We will also make a case for Conrad as one of the great observers of environmental and infrastructural change in the early fossil-fuel era, worth revisiting now as both witness and interpreter. Jesse Oak Taylor has noted that "Conrad's sea career, which provided the fodder for much of his writing, dovetails with the period, beginning in the 1870's, . . . [when] capitalism expanded beyond the bounds of the nation, and placed greater emphasis on speculation and extraction as opposed to industrial production."[2] Coaling stations and steamship routes were key infrastructural components of the world-historical changes that Conrad chronicled, and his narrative accounts of them helped shape wider conceptions of the oceanic modernity that was coming into being.

The first part of our essay will provide a cultural overview of Victorian coaling stations and steam routes via the periodical archive, and the next two sections will engage closely with Conrad's literary depictions of them in *Victory* and *The Mirror of the Sea*. Our overall goals are to demonstrate how the political geography of empire transformed with the rise of steam power and its infrastructure, especially with the emerging dominance of steam as the primary means of transoceanic travel and shipping, and to explore how these changes registered in literature and discourse, with Conrad as our prime example. We will analyze two of Conrad's works that prominently feature coaling stations and steam-carrying, ruminating at the same time on questions of infrastructural visibility and invisibility and on literature's role in mediating infrastructural changes of global significance, to show how the works both participate in and critique a new, steam-driven oceanic imaginary.

In a recent collection, Kelly M. Rich, Nicole M. Rizzuto, and Susan Zieger define infrastructure as "the flexible and temporally unstable structures that organize biological and social life."[3] By the end of the

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nineteenth century, coal was the lifeblood of economic exchange and circulated across greater distances at greater speeds. Coaling stations and other oceanic infrastructure played an important role in the globalization of the fossil-fuel economy but did not always register in literary and print culture as directly as industrialized mining and large-scale extraction did.[4] This does not mean, however, that they were invisible. Countering the commonplace observation that infrastructure is invisible, Brian Larkin has argued in "The Politics and Poetics of Infrastructure" that while "invisibility is certainly one aspect of infrastructure . . . it is only one and at the extreme edge of a range of visibilities that move from unseen to grand spectacles and everything in between."[5] He instead emphasizes the "production of ambient experience," the aesthetic means by which infrastructural invisibility is produced. Building on this idea, we argue that Conrad's work both contributes to and counteracts this production of ambient experience, expanding literature's range into the new worlds being produced with and by oceangoing coal. We can see this, for example, in the geographical breadth of Conrad's oeuvre, which depicts settings increasingly available to fiction because of steam and coaling stations. What is more, texts like *Victory* and *The Mirror of the Sea* absorb into their form and themes the aesthetic and logistical features of coaling infrastructure that we find elsewhere in the discourse of this period: the stop along the way; the stepping stone; the crucial, minute component in a larger system; the interplay of part and whole; the vulnerability born of complexity. Conrad's work is thus emblematic of what Geoffrey Bowker and Susan Leigh Star call "infrastructural inversion": by bringing infrastructural scenery to the foreground, Conrad enables us "to look closely at technologies and arrangements that, by design and by habit, tend to fade into the woodwork."[6] His works tune readers' forms of environmental understanding to the complex, global networks of the oceangoing coal economy, and in this way they can be said to exemplify the aesthetic mediation of the systemic and logistical thinking that the rise of fossil-fueled society produced.

Conrad was, however, no booster for steamships or oceangoing coal. To the contrary, as we will also argue, he depicts the influence of maritime steam as one that renders the ocean into dead infrastructure rather than living world. Lamenting the transition away from wind and sail, his work foregrounds the ocean and the people who work on it, conveying to readers the materiality of the sea despite the deadening impacts of steam. Attending to Conrad's oceanic spaces, we seek to avoid what Margaret Cohen calls "hydrophasia," a critical tendency to disregard the ocean

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"even where it is a work's explicit subject matter."[7] Rather than disregard the ocean, we want to convey what is to be gained from a critical approach that centers it. Steve Mentz has suggested, for example, that "If we turn from green pastures to blue oceans, we find an already present, partly explored environment for postsustainability thinking," one that allows us to read Conrad's account of a developing maritime coal economy as more than "pastoral nostalgia."[8] *Victory* and *The Mirror of the Sea* are not without nostalgia, but Conrad's nostalgia for sailing is a critical nostalgia that enables him to confront the real losses that came with a steam economy. His work suggests that the transition to coal was not inevitable, nor even preferable, despite its benefits to some, and it shows how the dynamic, living ocean central to the ecology of the sailing ship was deadened as steamships plotted networked vectors over Earth's oceans.

Reading the ocean as infrastructure, or thinking about the ocean as an infrastructure under steam, introduces two questions that seem to us central to recent infrastructural studies in the humanities. The first concerns how broadly to extend the term "infrastructure" and whether to use it to refer to conceptual or unbuilt categories such as labor, class, or race, as some critics have done.[9] The second question, even more germane to our analysis, concerns the increasingly difficult matter of disentangling "environment" from "infrastructure" in an era where we have been forced to grapple with the profound anthropogenic impacts that shape all parts of the natural world. As Kregg Hetherington writes, "environment and infrastructure share a great deal of conceptual territory, and the Anthropocene disturbs the distinction between them." A traditional means of distinguishing them, such as natural versus artificial, "no longer works when it is our infrastructures of global transportation and consumption that produce the anthropogenic environment on which infrastructures are built."[10] The ocean, in this sense, is no longer simply the environmental context in which oceanic infrastructure is built: it is the *outcome* of that infrastructure as well. Conrad's accounts of the buildup of coaling stations and other maritime infrastructure in the nineteenth-century oceanic world are rich sites to explore how the ocean itself was instrumentalized and transformed in the fossil-fuel era.

## 1. "The Stepping Stones of Empire": Marine Coaling Stations

To identify the aesthetic and formal features of oceanic infrastructure in literature and culture of this era and to position Conrad's work within this context, we turn first to one of Victorian print culture's most

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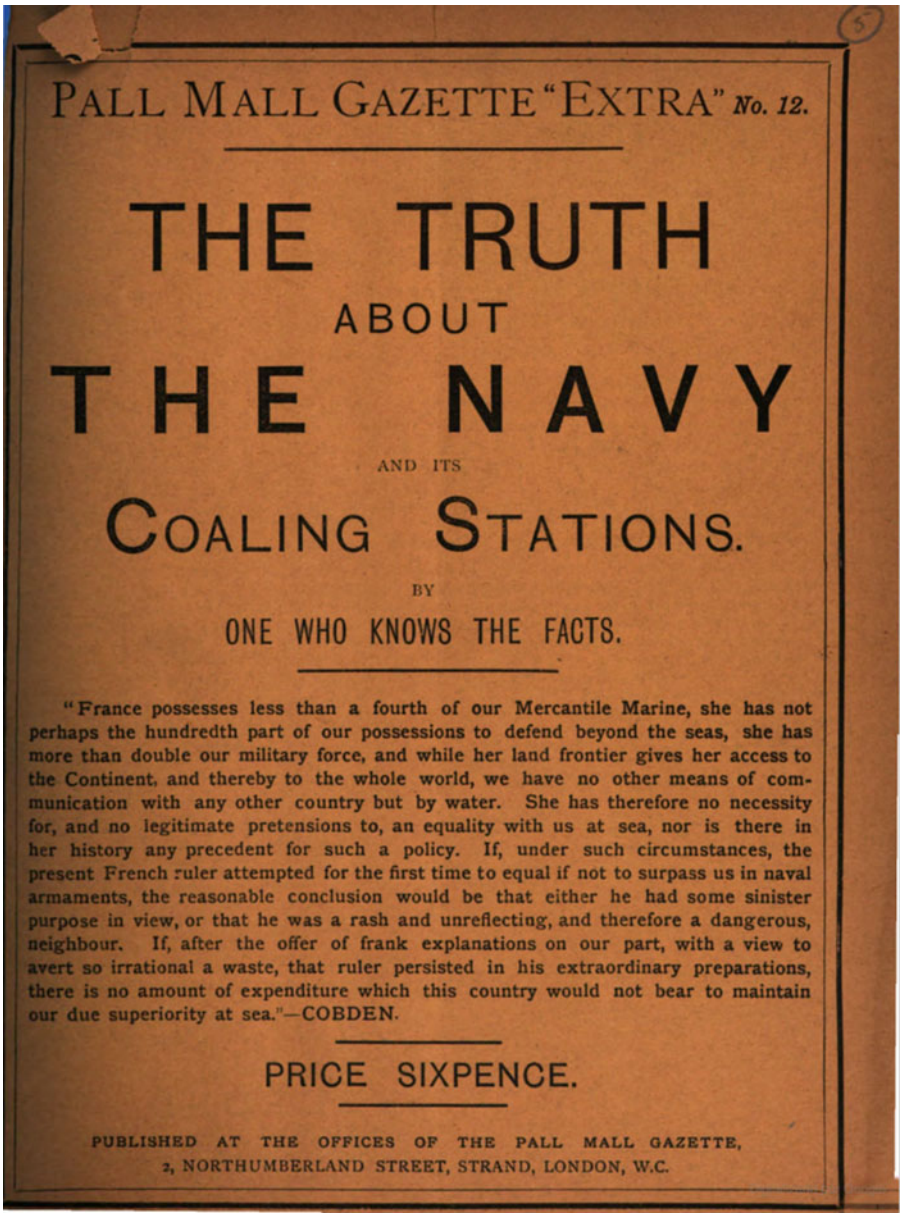
conspicuous engagements with coaling stations: an 1884 *Pall Mall Gazette* extra titled *The Truth about the Navy and Its Coaling Stations* (see fig. 1). This issue collected three articles that had run in the *Pall Mall Gazette* and garnered much attention. The author was the journal's


PALL MALL GAZETTE "EXTRA" No. 12.

THE TRUTH
ABOUT
THE NAVY
AND ITS
COALING STATIONS.

BY
ONE WHO KNOWS THE FACTS.

"France possesses less than a fourth of our Mercantile Marine, she has not perhaps the hundredth part of our possessions to defend beyond the seas, she has more than double our military force, and while her land frontier gives her access to the Continent, and thereby to the whole world, we have no other means of communication with any other country but by water. She has therefore no necessity for, and no legitimate pretensions to, an equality with us at sea, nor is there in her history any precedent for such a policy. If, under such circumstances, the present French ruler attempted for the first time to equal if not to surpass us in naval armaments, the reasonable conclusion would be that either he had some sinister purpose in view, or that he was a rash and unreflecting, and therefore a dangerous, neighbour. If, after the offer of frank explanations on our part, with a view to avert so irrational a waste, that ruler persisted in his extraordinary preparations, there is no amount of expenditure which this country would not bear to maintain our due superiority at sea."—COBDEN.

PRICE SIXPENCE.

PUBLISHED AT THE OFFICES OF THE PALL MALL GAZETTE,
2, NORTHUMBERLAND STREET, STRAND, LONDON, W.C.

**Figure 1.** *The Truth about the Navy and Its Coaling Stations. Pall Mall Gazette* extra no. 12 (1884).

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editor, W. T. Stead, a well-known pioneer of New Journalism identified here only as "One Who Knows the Facts."[11] Stead wrote the articles after talking to H. O. Arnold-Forster, secretary of the Imperial Federation League; this organization, founded in 1884, sought to shore up the British Empire by way of federalism, and it exemplifies the way that "the Empire" began to emerge in common parlance in the late nineteenth century only when it was imagined to be newly vulnerable.[12] Stead had become worried about the state of the navy, and he gleaned his material for the series from interviews with naval officers and others.[13] His preface to the issue says that the articles' "impression upon public opinion" was "almost without precedent in the annals of English journalism," and indeed the series did produce a tide of public anxiety about navy appropriations.[14]

In his effort to whip up public alarm about Britain's maritime vulnerability, Stead frequently refers to coaling stations as "the stepping-stones of empire," occasionally adding that "coaling stations . . . are the stepping-stones of commerce as well as of empire" (25). Sometimes he employs other figures to suggest a similar structural schema: "If one of [the coaling stations] were to be destroyed it would be as if a rung were knocked out of a ladder" (23). The image of a stepping stone or ladder rung conveys the idea of an ostensibly minor component without which the structure as a whole will not work, suggesting the new systematic complexity of the coal economy. This exemplifies how the management of energy resource flows in the late nineteenth century contributed to the rise of logistical thinking and the new science of logistics. Peter Schulman writes that, at this time, "logistics thinking was largely shaped by concern over fuels."[15] Through familiar metaphors like the stepping stone, readers of the *Pall Mall Gazette* were taught to see not just the import of coal but of the infrastructure through which coal became imperial: "the public has not even begun to comprehend the vital connection between coal and commerce, coal and empire," Stead writes, but while coal is "vital to the existence of" empire, "its power of action is limited by its proximity to a coaling station" (23). Coaling stations expand Britain's reach but also produce new forms of imperial vulnerability: more parts and more components mean more opportunities for failure.

Conrad's literary accounts of coaling stations, as we will see, are similarly taken up with the relation of the part to the whole and the question of how much the vulnerability or resilience of one small part can threaten or shore up the viability of the system.[16] Recent accounts of

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the history of the coal economy suggest that maritime coal was frequently understood at this time, perhaps surprisingly, in terms of imperial vulnerability rather than triumphalism. As Schulman observes, "steamships powered by coal offered new advantages of speed [and] power. . . . Yet unlike sail, coal tethered vessels to shore like never before. Fleets of steamships, both naval and commercial, depended on coaling stations."[17] Andreas Malm writes, too, of the nineteenth-century competition between steam and sail and argues that "it was clear from the start that steamers were weighed down by the burden of a bulky and expensive fuel: coal."[18] If coal and coaling stations were stepping stones, they were also tethers.

Our readings of Conrad will focus on the formal, conceptual, and aesthetic features of oceanic infrastructure and the global coal economy as expressed in literature, but let us establish first what these coaling stations and their network looked like. A 1905 call for bids to construct a new U.S. naval station in Olongapo, Philippines, provides a detailed inventory of a coaling station at this time: storage sheds for the coal, "a wharf alongside which vessels may lie while discharging or receiving coal," coal-hoisting towers, a rail conveyor for moving the coal, a crane and other machinery to assist the moving, means to weigh the coal, a water supply system, a power source, electric lighting (for stations that operate at night), a custodian's residence, and any necessary offices and outbuildings.[19] Constructing such a station required labor, fuel, and materials including steel, iron, concrete (cement, sand, stone, gravel), masonry, lumber, and fixtures of all kinds. Builders also needed to account for the ocean's tides and uncertain weather, and dredging, excavation, and retaining walls were sometimes required to reengineer the coastal landscape and make the station secure. In attempting to fortify the coaling station against the violence of the coastal ecotone, builders tried to mitigate the risk of infrastructural collapse; yet ironically, in our current era, the global warming that these very stations helped unleash now imperils coastal buildings and infrastructure to an existential degree. Increasingly, "coastal erosion exposure," which Christian Fraser writes is "the likelihood that a structure (building or infrastructure component) will be affected either by progressive retreat of the shoreline or by sudden retreat during a storm event," speaks to the gradual and catastrophic risks ascribed to building something ostensibly permanent in dynamic coastal zones.[20]

Beyond the individual station, coaling stations worked together in a global grid that determined steamship routes. In the late nineteenth

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century, Britain was unquestionably the dominant maritime power in "ocean-going merchant shipping, global communications, financial services, and globally deployable naval power," and this dominance extended to its coaling station network.[21] In the *Pall Mall Gazette* special issue, we find a detailed overview of Britain's forty-six naval and commercial coaling stations in 1884 (see fig. 2). The journal included maps of some stations, such as Singapore and Aden. At opposite ends of the Indian Ocean, these stations were among those identified by Stead as "primary" stations especially in need of defense and armament, indicating their strategic importance: "of these primary stations the most important are Hong Kong, Singapore, Bombay, Aden, and the Cape" (38). This nineteenth-century buildup of fossil fuel infrastructure in the Indian Ocean basin is the prehistory to Ghosh's argument that this fuel-rich region "is now the chief theater of the planetary crisis."[22] On Barak provides an extended case study of the profound impact of Britain's coal economy in shaping this part of the world: "only a small portion of the coal mined in the British Isles was exported outside of Europe, and only a small amount of that was shipped to the Middle East. Yet . . . this was enough to fuel a revolution of steamboat imperialism and eventually bring coal mining to life in the Ottoman Empire, as well as in India, China, and elsewhere."[23]

The British occupation of Perim is but one historical example of how the need to refuel drove Victorian colonial engagements in the

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|---|---|
| **Mediterranean** | Gibraltar, Malta, Port Said |
| **North America** | St John's, Halifax, Bermuda, Jamaica, St. Lucia, Antigua*, Barbadoes [sic]*, Nassau^ |
| **South America** | Panama^, Rio Janeiro [sic]*, Rio de la Plata^, The Falkland Islands |
| **The Cape** | Sierra Leone, Cape Coast Castle, Ascension, St Helena, Cape of Good Hope, C. de Verde Is.*, Fernando Po*, Congo*, St. Louis^, C. Palmas^, Gaboon^ |
| **India** | Aden, Bombay, Trincomalee, Mauritias, Zanzibar*, The Seychelles* |
| **Australia** | Sydney, Melbourne, Wellington, Fiji* |
| **China** | Singapore, Hong Kong, Shanghai*, Amoy*, Nagasaki*, Hiogo*, Yokohama^ |
| **Pacific** | Vancouver, Tobago (Central America)*, Caldera (Chili [sic])^ |

**Figure 2.** British coaling stations in 1884, from *The Truth about Coaling Stations* (p. 26). Includes primary Admiralty coaling stations in possession of England, secondary Admiralty coaling stations (*), and mercantile coaling stations (^). Table created from data listed in the *Pall Mall Gazette*.

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area. Situated at the doorway of the Indian Ocean, the island was under British control from 1857 to 1967, and a coaling station operated there for fifty years, opening in August 1883.[24] A July 1859 article originally in the *Washington Constitution* reported on the occupation, calling Perim "a barren rock . . . utterly unproductive of anything," though its situation makes it "the key of the Red Sea."[25] The island is presented as without intrinsic qualities of place, useless but for its location. This reflects a typical way of thinking about networks and network nodes that Nicole Starosielski calls "network topology, the observation of the geometric or mathematical distribution of nodes and links" in a system, in contrast to "network topography," which considers "the way that infrastructures are embedded into existing natural and cultural environments."[26] The article's account of empires jostling for footholds on islands like Perim presages how the politics of coaling stations would play out in subsequent decades, but "coaling station" appears in quotation marks throughout the article, suggesting the phrase's novelty in 1859 at the early end of the maritime transition to steam.

We now turn to Conrad's *Victory* and *The Mirror of the Sea*, both of which are premised on the expansion of maritime steam in the worlds they depict and on transimperial jostling over "stepping-stones of empire" in the coal era. Coaling stations are the energy infrastructure that shapes these texts, just as the texts reshape readers' global imaginations to align with the new prominence of the coal economy. The energy infrastructure of maritime coal makes itself felt in these works, we argue, through aesthetic, formal, and conceptual configurations, even as Conrad recounts the many ways that the steam economy was volatile, burdensome, and damaging.

## 2. Victory

Joseph Conrad had the most popular publishing success of his career with his 1915 novel *Victory*, which is set in an abandoned coaling station on Samburan, a fictional island in Southeast Asia. The climax of the novel is an attack on the station by three crooks looking for treasure; thus the novel imagines an assault on an undefended coaling station such as Stead's special issue warned about, but in this case the station is ironically defunct. On Samburan, the Tropical Belt Coal Company had dug a mine, built a jetty, raised a counting house and other buildings, piped water to the jetty "to accommodate ships that came for coal," and laid all the infrastructure for a coaling station, even rail for

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"the little trucks that had been used for running baskets of coal alongside ships."[27] But two years prior to the novel's action, the company collapsed and went into liquidation—a reminder of the complex risks of the coal economy. Despite the coaling station's brief life, for Samburan it would have lasting impacts. The island's Indigenous population, we learn in the course of the novel, has been displaced to one side of Samburan—a result of the station's development that persists even as capital pulls out and infrastructure rots. Now the dilapidated station "had the aspect of an abandoned settlement invaded by the jungle," with an "overgrown bit of road slanting . . . towards the shore . . . with a black jetty and a mound of some sort, quite inky" (22).

The mound, of course, is coal. The first lines of the novel reference the value of this fuel but also its material cumbrousness, complicated infrastructural demands, and stubborn habit of clinging to the bowels of the earth: "There is, as every schoolboy knows in this scientific age, a very close chemical relation between coal and diamonds. It is the reason, I believe, why some people allude to coal as 'black diamonds.' Both these commodities represent wealth; but coal is a much less portable form of property. There is, from that point of view, a deplorable lack of concentration in coal. Now, if a coal-mine could be put into one's waistcoat pocket—but it can't!" (20). Such are the material inconveniences of the global steam economy.

Left behind on the abandoned coaling station is Axel Heyst, the "manager on the spot of the Tropical Belt Coal Company with offices in London and Amsterdam" (43). Sometimes referred to as "the Swede," he remains on Samburan even after his company's collapse. As one character puts it, "The company is gone, the engineers are gone, the clerks are gone, the coolies are gone, everything's gone; but there he sticks" (50). What is perhaps most remarkable about this is that prior to his tenure on the island, Heyst had been a drifter. Son of a philosopher whose final book "claimed for mankind that right to absolute moral and intellectual liberty," Heyst decided, after his father's death, "'I'll drift' . . . He did not mean intellectually or sentimentally or morally. He meant to drift altogether and literally, body and soul, like a detached leaf drifting in the wind-currents under the immovable trees of a forest glade; to drift without ever catching on to anything" (136). His father had claimed man's right to absolute liberty: freedom even (we might say) from environmental limits. Heyst's decision to "drift" enacts his father's fantasy of a frictionless existence, moving across the world "without ever catching on to anything." And yet Heyst does catch, eventually,

on Samburan's abandoned coal station, choosing not to leave. This can be connected to the island's identity as a coaling station in two ways. The shift to a fossil-fuel economy was fostered by the belief that coal liberated humanity from environmental constraints, allowing faster travel, less work, more production. Coal, we might say, was the material basis for Heyst's father's vision of absolute freedom, whether he realized it or not; it was the means by which that freedom was imagined to be achievable. But the complexities and cumbrousness of the coal economy, illustrated in *Victory* through the demise of the Tropical Belt Coal Company, also point to fossil fuel's propensities for bogging us down, for ensnaring us in material exigencies rather than liberating us from them. That Heyst remains on the station rather than drifting away from it conveys not coal's freedoms, then, but its tethers.

Heyst's "drifting" also recalls a presteam form of movement across waters. As Nigel Clark and Bronislaw Szerszynski put it, "to drift is to rewind to the pre-Cambrian, when things basically floated in response to winds and currents, or rolled and slid down slopes" in the manner of "undirected motion."[28] Seemingly undirected motion describes the movement of many characters in the novel, but they are actually cast about the globe by the directed motions of the steam network. This shows how a movement that was once an effect of nature—drifting—is now an effect of steam. Gamblers, migrant laborers, hoteliers running their third Southeast Asian hotel—all have drifted along the routes laid out for them by the steamship empire. This is true of the white characters in the novel as well as the novel's sole character of color, Wang, a Chinese laborer in circumstances not unlike Heyst's: "The graves of Wang's ancestors were far away, his parents were dead, his elder brother was a soldier in the yamen of some Mandarin away in Formosa. No one near by had a claim on his veneration or his obedience. He had been for years a labouring restless vagabond" (419).[29] Wang is not a major character in the novel, but he plays a key role in its final conflict, and he represents the mass emigration of Chinese laborers that began in the mid-nineteenth century and included more than nineteen million emigrants to Southeast Asia, the South Pacific, and the Indian Ocean basin between 1846 and 1940.[30]

The "drifting" is true of the few women in the novel as well. When Heyst meets Alma, an exploited English violinist traveling with the Zangiacomo Orchestra, he learns that "she really had no definite idea where she was on the surface of the globe. The orchestra was generally taken from the steamer to some hotel, and kept shut up there till it

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was time to go on board another steamer" (119). The all-female orchestra travels the sea-highways that cross the world, entertaining the workers of empire at its outer reaches. Eventually Heyst takes Alma back with him to Samburan, where they briefly live in Edenic union, but Conrad emphasizes not so much the detachment of the island as its connectedness with the rest of the world via the ocean's waters: it is "surrounded . . . by a tepid, shallow sea; a passionless offshoot of the great waters which embrace the continents of this globe" (21).

In her discussion of the importance of islands in undersea fiber-optic cable networks, Starosielski writes that islands and networks are often treated as "mutually exclusive categories," with islands defined in terms of insularity and networks in terms of interrelationality (172). In fact, however, with the rise of global communication networks, the seemingly remote island became a "critical node," "site of interconnection," and place "where one kind of network could be leveraged to facilitate the development of another" (180, 176). The same could be said about the role of islands in the development of a nineteenth-century coaling station network—a development that precipitated and overlapped with the laying of global telegraph routes.[31] Conrad's Samburan is an island in the era of coaling stations: too connected to remain an Eden for long, as we see with *Victory*'s accurate satire of the prospectuses that circulated at this time to promote investment in faraway nodes of the coal economy like the Tropical Belt Coal Company:

> [On] the map which accompanied [the prospectuses] for the edification of the shareholders . . . Samburan was represented as the central spot of the Eastern Hemisphere with its name engraved in enormous capitals. Heavy lines radiated from it in all directions through the tropics, figuring a mysterious and effective star — lines of influence or lines of distance, or something of that sort. Company promoters have an imagination of their own. There's no more romantic temperament on earth than the temperament of a company promoter. (46)

The promoters' "romantic" idea to place tiny, remote Samburan at the center of the world conveys the strategic role of island coaling stations in expanding steam power at sea.

Samburan was perhaps not strategically sited enough to succeed as a coaling station, but the island was not chosen for its situation alone. If most coaling stations were understood to be abstract spaces, meaningful only as stepping stones or sites of interrelation without intrinsic qualities of place, Samburan is different. It is the setting of a novel, for one thing,

and by setting his novel in such a place Conrad encourages us to think about the coaling station from the perspective of Starosielski's "network topography" ("the way that infrastructures are embedded into existing natural and cultural environments") rather than the more common, abstract conceit of "network topology" (28). Moreover, Samburan "was not merely a coaling station. There was a coal-mine there, with an outcrop in the hillside less than five hundred yards from the rickety wharf" (23). It has a value of its own, underground, in its coal, though Tropical Belt Coal Company failed to find a way to plug this value into the circuits of the fossil economy. The "belt" in the company's name suggests a connected infrastructural network, but the defunct station shows that the network failed. By the 1890s, when the novel is set, "the jungle has choked the very sheds" of the station (56), yet Heyst finds it hard to abandon. Another character asks him what his "object" is in staying put. "Are you thinking of keeping possession of the mine?" He responds, "Something of the sort . . . I am keeping hold" (53).

Ultimately *Victory* is a tragedy, with all the main characters dying at the end of the novel after three villains attack in search of Heyst's rumored, nonexistent treasure. The final section is laden with ironic echoes of Robert Louis Stevenson's *Treasure Island* (1883), a spectacularly popular, frequently imitated adventure novel that helped transmute extractive imperialism into narrative form.[32] But Samburan's only underground treasure was its coal, and the Tropical Belt station burns down at the end of the novel. One character refers to the conflagration, set by Heyst, as a purification (561). Many of the novel's earlier descriptions of the island environment foreshadow this finale, but with an earthly rather than human cause, such as the "consuming, passionate blaze of sunshine outside, all aquiver with the effort to set the earth on fire, to burn it to ashes" (417), or the "great heat ascend[ing] from the sun-smitten ground, in an ever-rising wave, as if from some secret store of earth's fiery heart" (449). On Samburan's closest neighboring island, too, is a volcano "which smoked faintly all day . . . and at night levelled . . . a dull red glow" (21). In this way Conrad creates an atmosphere of environmental risk that, coupled with the station's evident financial risk, produces a sense of systematic vulnerability hanging over the maritime coal economy.

## 3. The Mirror of the Sea

With *Victory*, Conrad employs the setting of Samburan to help us rethink empire from the perspective of the coaling station, an infrastructural

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waystation that highlights the liabilities of an oceanic world transformed by fossil fuels, but in *The Mirror and the Sea* (1906) we have a memoir of Conrad's experience as a sailor navigating those transformations at a time when maritime labor was rapidly changing in the face of steam. The focus of his account is far different from what we find in the periodical press. Reporting on "the defenceless state of the coaling stations on the road to Australia," the 1884 edition of the *Annual Register* alleged that "an expenditure of at least two millions would be required to place the principal coaling depôts in a state to hold out against the improvements of naval gunnery and science."[33] Terrestrial metaphors like Stead's "stepping-stones" and the *Annual Register*'s "road to Australia" reveal how coaling stations were viewed as critical citadels for a British Empire now reliant upon coal to fuel its expansion. Published in 1906 from a series of previously published short pieces, Conrad's autobiographical *The Mirror of the Sea*, too, recognizes the world-historical nature of the Victorian transition from sail to steam, but unlike the accounts from the *Pall Mall Gazette* and the *Annual Register*, which advocate for governmental spending to undergird Britain's increasing network of coaling stations, Conrad's text is sensitive to the adverse implications of the transition to a coal-powered fleet. One such implication is a changed relation to the world's waters. Written as a reflection on his time as a sailor in France and in the British Merchant Service, *The Mirror of the Sea* documents Conrad's experiences on many of the ships upon which he served. At the same time, it reads as a lamentation for the rise of the steamship as the dominant vessel for transoceanic voyages.

In "The Prospect of Oceanic Studies," Hester Blum argues that "the sea is not a metaphor. Figurative language has its place in analyses of the maritime world, certainly, but oceanic studies could be more invested in the uses, and problems, of what is literal in the face of the sea's abyss of representation."[34] This observation delineates a key tenet of the blue humanities, and Cannon Schmitt has made a similar argument focused specifically on Conrad's work.[35] Returning to Conrad with this "literalism" in mind, we find oceanic spaces that resist the linear narratives of progress implied by terrestrial analogs like "stepping-stones" and "road." *The Mirror of the Sea* is concerned with how the transition to steam recasts the relation between ships and oceanic spaces, and it draws our attention to fuel infrastructure especially through its account of the propeller that serves as Conrad's metonymic emblem of the steamship's relentless progress. With his account of the propeller and other steamship infrastructure in *The Mirror of the Sea*, Conrad shows how the

mid-nineteenth-century shift to steam transformed the ocean from an integral part of a maritime existence to infrastructure—to something, as Susan Leigh Star puts it, "invisible, part of the background for other kinds of work."[36]

Vessels are central to *The Mirror of the Sea*, which not only hearkens back to a recent past but also broods over what Conrad argues is an "inevitable future."[37] As Margaret Cohen notes, "ships belong to a domain of tangible practices," and in this way "may seem far removed from the concerns of aesthetics, epistemology, and representation so important to literary scholarship."[38] But Conrad's depiction of ships and their differing relations to oceanic spaces is critical to reading the shifting seas of the transition to steam. Above all, Conrad characterizes the coal-powered vessel as in conflict with its surroundings, its environment: "The modern steamship advances upon a still and overshadowed sea with a pulsating tremor of her frame, an occasional clang in her depths, as if she had an iron heart in her iron body" (65). Depicting the sea as "still" emphasizes a coal-fueled form of progress that is discordant with the ocean itself. In Conrad's windless night, the steamship "advances" with a "pulsating tremor" and "clang," regardless of the still conditions. Here, the steamship comes to represent what Jason Moore refers to as capitalism's Cheap Nature strategy, "to represent time as linear, space as flat, and nature as external."[39] The ship presses toward its goal through the night, and because of the "iron heart in her iron body," it flattens an ocean that is "advanced upon." The ocean loses its dynamism and becomes the inert infrastructure upon which commerce and empire are distributed.

In *The Mirror of the Sea*'s description, the era of sailing has been foreclosed as the steamship moves "with a thudding rhythm in her progress and the regular beat of her propeller, heard afar in the night with an august and plodding sound as of the march of an inevitable future" (65). In this drone, we can almost hear the path dependencies of the fossil-fuel economy being formed. While one could argue that the propeller's rhythm mimics a heartbeat, that heart is an artificial one, and the ship's "plodding" and "march[ing]" transforms the sea into *terra firma* to be crossed and not navigated. Contrast this mechanization with the conclusion of the passage, which describes a sailing vessel: "in a gale, the silent machinery of a sailing-ship would catch not only the power, but the wild and exulting voice of the world's soul" (65). Sailing ships, Conrad suggests here and elsewhere, need to work in concert with the ocean and wind, as sailors "catch" the power of the gale and hear "the wild and exulting voice

of the world's soul" in contrast with the martial air of the steamship's "march." A coal-powered vessel, as Conrad later writes, instead "does not so much make use of the sea as exploit a highway" (89).[40]

Conrad's emphasis on the sea's transition to highway draws our attention to the relational triangle established between the ocean, sailing ships, and sailors. "The men of today, born and bred to the use of steam," Conrad writes in a tribute to Lord Nelson, "can hardly realise how much . . . risk was in the weather" (172). Though he could be said to underestimate here the weather's potential effects on steamships, Conrad suggests that the main threat the steamship faces, by contrast, is for one of its many parts to fail: "Of all ships disabled at sea, a steamer who has lost her propeller is the most helpless. And if she drifts into an unpopulated part of the ocean she may soon become overdue" (82–83). Characterizing the ship as "helpless," Conrad suggests the correlation between the flow of the steamer powerlessly drifting out of known shipping lanes and the foreboding diction of insurance policies, of being "overdue."

As with the coaling station in *Victory*, the propeller here represents the weakness of a complex steam network dependent on so many components for the larger system to function. Writing about Conrad's work of this period, Allen MacDuffie argues that we can see him "plotting the coordinates of an exploitative, directional, global economy imagined in the thermodynamic vocabulary of energy flow, efficiency, and waste."[41] Under steam, the ocean itself becomes a populated highway, and it is only when the internal infrastructure of the steamship fails that the ocean materializes as itself and not simply as commercial infrastructure. "The menace of the 'overdue' and the finality of 'missing,'" Conrad writes, "come very quickly to steamers whose life, fed on coals and breathing the black breath of smoke into the air, goes on in disregard of wind and wave" (83). It is only when "disabled" that the steamship becomes vulnerable to the material environmental conditions of the sea; otherwise, "disregard[ing] wind and wave," the ship plods on toward its goal and the ocean is turned to lifeless infrastructure under the regime of steam.

If steam for Conrad, is mere mechanism and infrastructure sail is more enigmatic: "A very little affects the speed of an iron [sailing] ship which is not driven on by a merciless propeller" (72). Here Conrad references propeller-driven steamships that seem to course across the seas like Coleridge's ghost bark in "The Rime of the Ancient Mariner" (1798), with the "merciless" engine taking the place of horses being "driven on" by an abusive coachman. Under sail, however, speed has a quality of "mysteriousness" that comes from the sea itself: "A certain mysteriousness hangs around the

quality of speed as it was displayed by the old sailing-ships commanded by a competent seaman" (72). *The Mirror of the Sea* depicts a steamship as "fed on coals and breathing the black breath of smoke into the air" and as closed off, largely unaffected by its environs, whereas ships under sail rely upon an ecology of the hydrosphere, the atmosphere, and the biosphere in the interconnectedness of the ocean, the wind, and the crew (83).

Echoing Byron's canto IV of *Childe Harold's Pilgrimage* (1818), the title of Conrad's memoir points us toward a reconceptualization of ocean spaces over the course of the nineteenth century. When Byron writes, "Thou glorious mirror, where the Almighty's form / Glasses itself in tempest; in all time" (IV. 1639–40), his metaphor abstracts the sea and characterizes the ocean as reflecting qualities of omnipresence.[42] In Coleridge as well as Byron, we see the ocean as aligned with the supernatural and sublime, in line with Romanticism's broader depictions of wilderness. The Romantic ocean is a space that, far from being contained or affected by human enterprise, is "Dark-heaving—boundless, endless, and sublime— / The image of Eternity" (IV. 1643–44). If the sea, for Byron, was infinite, this suggests that in the Romantic period oceanic spaces were at some level beyond the scope of human exploitation or despoilation. When *The Mirror of the Sea* twice alludes to its title, however, Conrad writes that the sky—not the divine—is reflected in the ocean's surface. For Conrad, the rise of coal as the prime mover of transoceanic voyaging troubles his metaphor, as the dynamism and power of the ocean under sail gives way to oceans deadened and obscured by a smoke that recasts them as featureless highways. Mere mirrors, passive and flat.

## 4. Conclusion

Up until World War I, Katherine Epstein writes, Britain controlled "the sinews, or infrastructure, of globalization," including "ocean-going merchant shipping, trans-oceanic communications (cables and radio), and global naval power."[43] In 1914, "of the 4,800 larger ocean-going vessels in the world, 3,000 were registered to British companies."[44] Readers of the *Pall Mall Gazette* in 1884 worried that Britain had entered a period of maritime decline and that its large network of coaling stations made it vulnerable to international competition. Whether they were wrong or whether they were prognosticating a decline in global hegemony that would not come until the twentieth century, the journal's special focus on coaling stations demonstrates that the import of maritime coal and the globalization of the coal economy were becoming widely conceived in this moment. Conrad's writing

is an important example of the role of literature and discourse in mediating this transformation in understanding. In an analysis of what he calls "Conrad's carbon imaginary," Michael Tondre has written that "substances such as oil and coal find legibility through the iterative processes of speech, writing, and representation; those substances are not pregiven as resources waiting to be consumed en masse."[45] Putting the ocean at the center of his accounts of steamship modernity, Conrad demonstrates that the nineteenth-century rise of oceangoing coal produced a new global imaginary, one that was governed by systemic and logistical thinking, reshaping coordinates of thought accordingly, and one that made oceanic infrastructure increasingly central to the imperial project. Here we see an ocean transformed from sailing ships' dynamic collaborator to effectively inert infrastructure through the logic and logistics of coal-fueled steam transport.

Brian Larkin has called for a "poetics of infrastructure," arguing that infrastructures "also exist as forms separate from their purely technical functioning, and they need to be analyzed as concrete semiotic and aesthetic vehicles oriented to addressees." Examining literature by Conrad, this essay has taken a different approach to the poetics of infrastructure, but one that is equally "alive to the formal dimensions of infrastructures" and "what sort of semiotic objects they are."[46] Our goal has been to show how the nineteenth-century advance of the fossil-fuel economy in the maritime world formed in representational schemas such as novels and memoirs as well as in real oceanic environments and infrastructural networks.

## Notes

1. Ghosh, *The Nutmeg's Curse*, 105, 116.
2. Taylor, "Wilderness after Nature," 22–23.
3. Rich, Rizzuto, and Zieger, "Reading Infrastructure," 1.
4. See Miller, *Extraction Ecologies*, for the argument that developments in literary genre and form from the 1830s to the 1930s correspond with the rise of industrialized mining and the globalization of extractive industry.
5. Larkin, "The Politics and Poetics of Infrastructure," 336.
6. Bowker and Star, *Sorting Things Out*, 34.
7. Cohen, "Literary Studies," 658.
8. Mentz, "After Sustainability," 586, 587.
9. For example, see Rich, Rizzuto, and Zieger for a discussion of race as infrastructure ("Reading Infrastructure," 12–13).
10. Hetherington, "Keywords of the Anthropocene," 6.

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11. Stead is best remembered for his "Maiden Tribute of Modern Babylon" series, published the following year in 1885, which focused on child prostitution and led to the passage of the Criminal Law Amendment Act.
12. As an example of this, see J. A. R. Marriott's 1900 article "The Imperial Note in Victorian Poetry" from the *Nineteenth Century*. Marriott says the "imperial note" in early nineteenth-century poetry "is conspicuous only by its absence" but that the publication of Tennyson's dedicatory epilogue to *The Idylls of the King* in 1872 "marks . . . the beginning of the new epoch" (238, 241).
13. Ledbetter, *Tennyson and Victorian Periodicals*, 138.
14. [Stead], *The Truth*, 3. All subsequent references to this edition are noted parenthetically in the text.
15. Schulman, *Coal and Empire*, 12.
16. See Gagnier, *Individualism*, for an argument that the relation of part to whole was a central aesthetic and formal concern of late Victorian literature. Our paper pursues a conceptual origin for this shift rooted in the rise of fossil-fueled infrastructure and economy.
17. Schulman, *Coal and Empire*, 5.
18. Malm, "'This Is the Hell,'" 131.
19. Navy Department, *Specification No. 1436*.
20. Fraser et al., "Development," 1108.
21. Epstein, "Sinews of Globalization," 40.
22. Ghosh, *The Nutmeg's Curse*, 116.
23. Barak, *Powering Empire*, 1.
24. Too late, it would seem, to be included in the count in Stead's 1884 special issue.
25. "The Occupation," 5.
26. Starosielski, *The Undersea Network*, 28. All subsequent references to this edition are noted parenthetically in the text.
27. Conrad, *Victory*, 318, 254. All subsequent references to this edition are noted parenthetically in the text.
28. Clark and Szerszynski, *Planetary Social Thought*, 140.
29. There are some Indigenous characters on the fringes of the novel, but they are unnamed and little narrated.
30. See Kuhn, *Chinese among Others;* and McKeown, "Global Migration." On literature in this context, see Lowe, *The Intimacies*.
31. As Starosielski writes in *The Undersea Network*, "the geography of telegraph routes in the late nineteenth century followed transportation and trade routes" (31).

32. For more on this, see Miller's *Extraction Ecologies*.
33. *Annual Register*, 261.
34. Blum, "The Prospect of Oceanic Studies," 670.
35. Schmitt, "Tidal Conrad."
36. Star, "The Ethnography of Infrastructure," 380.
37. Conrad, *The Mirror of the Sea*, 65. Subsequent quotations in text.
38. Cohen, "Literary Studies," 657.
39. Moore, *Capitalism*, 61.
40. For more on the distinction between "artificial" steamships and sail in Conrad's work, see Boone, "Dirty Weather," 102
41. MacDuffie, *Victorian Literature*, 199.
42. Byron, *Byron's Poetry and Prose*, 347.
43. Epstein, "Sinews of Globalization," 37.
44. Epstein, "Sinews of Globalization," 40.
45. Tondre, "Conrad's Carbon Imaginary," 59.
46. Larkin, "The Politics and Poetics," 329.

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