Olive Heffernan
The High Seas: Greed, Power and the Battle for the Unclaimed Ocean
Vancouver: Greystone Books; London: Profile Books, 2024
ISBN: 978-1-77164-588-1 (HB) Can$42; 978-1-78816-358-3 (HB) £22.00. 368pp.

Corey Ross
Liquid Empire: Water and Power in the Colonial World
New Jersey: Princeton University Press, 2024
ISBN: 978-0-691-21144-2 (HB) $39.95/£35.00. 464pp.

It all begins, Olive Heffernan tells us, with the Dutch. At 8am on February 25, 1603, Captain Jacob van Heemskerk began a fateful attack on the *Santa Catarina*, a Portuguese merchant ship laden with china and silk. The goods were physically secured by the Dutch within a day; legally, however, the situation was rather more complex. The task of articulating a justification for this act of piracy fell to Hugo Grotius, who argued, more as a bolstering aside than as his main point, that because of the vastness of the ocean and its resources, no one nation could lay claim to the high seas. From that moment on, the challenge of governing the open ocean has been one that we have generally failed to meet. In her introduction to *The High Seas*, Heffernan guides her readers from the eighteenth-century creation of the 'three-mile limit', which gave nations authority that stretched as far as cannon fire, to the introduction of steam-powered trawlers in the late nineteenth century, which eventually led to the introduction of a 200-mile limit under the Law of the Sea, which came into force in 1994. The limits themselves are rather beside the point: what *The High Seas* does is explore the exploitation, pollution and ecological centrality of the huge swathes of ocean governed by no nation or union at all.

Our journey with Heffernan, an acclaimed science writer and marine biologist, begins in earnest in Norway, where government-funded labs are investigating the possibilities of sustaining their salmon aquaculture with fish gathered from the twilight. Norway's plan is to eventually harvest approximately one million tons of mesopelagic fish per year; one tenth of all the fish in the twilight zone. Currently Norwegian salmon feed is composed of 'eight or nine ingredients […] including food colouring from China, beans from Ukraine, wheat from Europe, krill from the Southern Ocean, and soy from a variety of places including Brazil' (p. 38). Feeding salmon mesopelagic fish instead would increase their omega-3 content, making them more nutritious, and it would reduce transportation emissions. And because mesopelagic fish are small, their populations are expected to rebound more quickly if overfished because of their shorter life cycles – in comparison to, say, cod. The high seas, at first glance, seem an untapped resource. But the consequences of exploiting them may well be catastrophic. Mesopelagic fish function as carbon capture devices: they eat high-carbon foods close to the surface of the ocean, and bring

them down into the depths of the ocean, where they can no longer influence the climate. The impact that removing a tenth of these fish annually would have on the climate is completely unknown, Heffernan tells us. And in order to actually catch these fish, fishing vessels would need to spend extended periods of time at sea, 'guzzling fuel, using heavy nets and filtering huge volumes of water' (p. 67). The role that these fish play in the food webs of other species is unclear, but makes the stakes of (over-)fishing them even higher.

The following chapters cover crime on the high seas, deep-sea mineral mining, oceanic carbon sequestration plans, the 'Atlantification' of the Arctic through new northerly sea lanes, krill fishing in the Antarctic, biodiscovery and biopiracy, ocean pollution, towing icebergs for drinking water, and the failures of marine sanctuaries. In each chapter, Heffernan follows roughly the same formula: she introduces a particular use of the high seas, talks about its effect on the ecology of the area, interviews scientists and engineers about the problem, and discusses the successes and failures of international law and international governing bodies. Heffernan's deep scientific knowledge of how ecosystems work – from the impact of temperature to ocean currents to carbon consumption – is excellent and allows her to draw connections between different kinds of human interventions that are not immediately obvious. This is complemented by a solid historicisation of many of the trends Heffernan is detailing in the present – for example, the development of the Antarctic Treaty System, the move to harvest krill in the 1970s, and the Cod Wars of the mid-to-late twentieth century. Where such historical context is not present, the book functions almost as a collection of potential research topics for maritime and environmental historians.

The book's implicit premise is that the lack of regulation of the open oceans makes them particularly vulnerable: if only there were some neutral, environmentally conscious, well-resourced international body that could decide if and how the riches of the high seas should make their way into human hands. Throughout the book, though, we are introduced to several international bodies that fail entirely in their purpose. Take, for example, the International Seabed Authority, which is tasked both with protecting the seabed and judiciously deciding which parts of it can be mined; or the Convention for the Protection of Antarctic Marine Living Resources, which must protect krill and the animals it feeds while also deciding how much of it can be consumed by humans each year. The recurring conclusion Heffernan comes to – sometimes implicitly, sometimes explicitly – is that these international bodies, thus far, have not balanced long-term ecological stability with short-term economic gain. Heffernan, in the end, recognises the error in her initial premise: 'I, like many, viewed the high seas as a lawless frontier. I thought, somewhat naively, that if we just implemented more rules, we'd get a different outcome' (p. 308). The models of international oceanic governance that exist do not exactly inspire hope.

This is a reasonable conclusion, of course, but it leaves the reader rather like Heffernan at the end of the book – equally hopeful and hopeless that some better way of managing the oceans will somehow arise. Perhaps a more interesting conclusion would be a focus on the nexus of scientific knowledge production and commercial interests that haunts *The High Seas* but is never interrogated in depth. Most of the scientists and engineers Heffernan interviews work for companies or governments which hold a very real stake in oceanic exploitation. Their work relies on the notion that oceanic ecosystems can be understood in their entirety; that their reactions can be predicted; and then carefully exploited. The accompanying standardisation and management of oceanic life for human gain alone is never, in itself, under question.

In *Liquid Empire*, however, it is exactly that tendency towards standardisation and exploitation that historian Corey Ross identifies as the central characteristic of colonial regimes' relationships to water. The book focuses on the control and use of rivers, deltas and sometimes seas by colonial powers in Asia and Africa, most often in the nineteenth century. However, one of Ross's central arguments is that the infrastructure of and general attitudes towards water management continued well after the official end of colonisation, so we often visit the twentieth century, too. Ross maintains an admirable geographic range throughout the book: in each of his eight chapters, he surveys Asia and Africa, scrutinising several different colonial regimes in each locale. Ross's command of various ecologies, geographies and political meanings across space and time renders the commonalities across his case studies all the more obvious; the overarching story of colonial water management is always the same. Colonial authorities, whether British, French or Dutch, see the transformation of colonial land- and waterscapes as an act of self-fashioning and self-aggrandising. Their conception of and identification with modernity could not allow for any unexploited land, any non-standardised, irregular outputs. And their belief that nature could be controlled and exploited led them to disregard and destroy the ways that local people had managed and used rivers for hundreds of years.

Liquid Empire – like Ross's 2017 book, *Ecology and Power in the Age of Empire* – is remarkably well-structured. Scholars of modern empire, Ross tells us in his introduction, have generally focused on the terrestrial control that modern imperial powers exerted: that was what differentiated them from the maritime empires of the early modern period. Ross's intervention is to ask us to look at water again – and generally, at rivers rather than seas. Water 'flowed through the entire project of modern imperialism'; it undergirded everything from transport to agriculture to tax revenues (p. 6). *Liquid Empire* is largely a synthetic work, drawing together more specialised historical research on empires and water (think, for example, of Sunil Amrith's *Unruly Waters*, or Philipp Lehmann's *Desert Edens*, both of which are cited in this book) – though Ross draws many of his examples directly from primary sources, too.

It is an excellent state-of-the-field book, but is also impressively detailed, particularly when it comes to the ecology and geography of the different regions Ross covers.

The first body chapter deals with water and mobility: the charting of rivers and their transformation into navigable waterways, and the symbolic significance of navigable rivers as 'conduits of imperial authority and commercial expansion' (p. 64). Ross then moves to the unpredictability of water in colonial territories, the impact of monsoons and irregular rainy seasons, and irrigation. Ross, more so than Heffernan, has a keen eye for the economic motives driving the scientific standardisation of colonial waterscapes – though to be fair, such assessments are perhaps easier in hindsight. The design and functioning of irrigation systems was based on a new trend among water engineers of conceiving of rivers through 'mathematical models that could be comprehended, calculated and controlled for the purpose of maximizing distribution, productivity and income generation' (p. 67). Throughout *Liquid Empire*, Ross emphasises that the control of water often allowed increased trade through easing exportation and increasing profit margins, and was often coupled with a standardisation of the amount of taxes and duties that were expected from farmers and other locals by the colonial regime. In short, while undergoing significant changes in the availability of water and the very structure of rivers, colonial subjects also faced increased and continuous extraction.

Ross turns next to landscape transformation – the draining of swamps and the far-fetched schemes of turning desert into arable land through damming seas and rivers – and then to flood control. Yet again, *Liquid Empire* emphasises colonists' abhorrence of 'unproductive' land, and their desire for complete and efficient extraction. Further chapters cover sanitation, hydropower and the legacies of colonial water management after independence. Chapter five – on colonial fisheries – is particularly instructive to read alongside *The High Seas*. Colonial powers saw traditional fishing methods as unproductive, and either imposed the use of larger, more technologically advanced vessels on local fishermen (mostly in Asia) or attempted to bring over modern fishing fleets from the metropole (mostly in Africa). All of this intervention was underwritten by the idea that northern maritime fisheries were already sufficiently or over-exploited due to industrial fishing. In contrast, fisheries in the Global South were perceived as under-exploited; 'a gigantic storehouse of resources' that could be used to great effect (p. 216). Often, colonial officials expected much larger fish stocks in these warmer waters than were actually present; generally, only after the First World War did colonial scientists start paying attention to the ways in which different ocean temperatures could produce different kinds of marine life. The partial nature of colonists' knowledge – and crucially, their tendency to act on the most optimistic estimate – led to many quick depletions of maritime fisheries.

Ross opens and closes his book with a depressing kind of accounting that will be all too familiar to readers of climate literature: water quality is rapidly deteriorating, two-thirds of the world's population experience water shortages each year, ninety percent of fisheries are overexploited. In short, things are bad! One of Ross's goals is to show how colonial water management has contributed to the present unequal distribution of climate change's effects – through continued commercial interests, physical structures and transferred ideologies – and these bookends do the job. They are also symptomatic of the pressure that environmental historians in particular face to address, in some way, the current climate crisis. Ross's version of this is solid – among other things, he suggests 'protecting forests, mangroves and wetlands […] returning former 'wastelands' back to their previous unruly state […] reducing the level of water pollution from sewage, industrial wastes and agricultural fertilizers' – and his suggestions would indeed roll back some of the damage that modern imperialism would do to the environment (p. 390). His assessment of the present does lack some of the economic analysis that his historical work has in abundance: none of the solutions he proposes in the conclusion are likely to be sufficient (or even happen) absent a fundamental change in our economic system, and a more expansive acknowledgment of that might have fit better with the tone of the rest of the book. There are no simple solutions, of course, and if anything, Ross's book makes us think about the gulf between a historical accounting for the ravages of colonialism on the people, animals, landscapes and plants living in the Global South and anything approaching restitution. And yet, if environmental historians want to continue laying out the lessons of the past for the present and near future, it seems fair to say that we should do so with as much analytical force as we treat the past. Hindsight cannot be our only clarifying agent.

AILISH LALOR
Harvard University