

Commercial Extinction

The Exhaustion of Exhaustion

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The emergence of commercial extinction, as a concept, is deeply complex. On a basic level, it designates that a species' population is so depleted that is no longer profitable to harvest. Extinct for the purposes of commerce. Yet this definition does not appreciate the technosocial assemblages that constitute this condition. The British colonial project, for example, was fueled by resource scarcity in land and seascapes. The understanding of the depth of landscape facilitated prospection, and consequently resource extraction, throughout the "Empire of Free Trade." The sea that had been depicted as boundless also learned its depth. The forces of scarcity pushed fishermen across the Atlantic and through the Northern Passage. Meanwhile, through capital's blindness to entities that are not financially quantifiable, commercial extinction appears to have afforded the survival of certain species, such as the brown shrimp—perhaps an unlikely mode of resistance can be located in capital's failure to consume the unquantifiable.

Exhaustion drove not only colonial exploration, but demand itself. The London palate accepted shrimp only once the oyster population had been depleted. Scarcity also fuelled technical innovations in modes of capture and working gear. The trawler, for example, has become the world's most disruptive and economically productive fishing technology. But as newer equipment demands larger investments, accruing debt has become intimately entangled with commercial extinction. The price of oil also has tremendous agency in resource extraction, causing wells to be closed, others to be opened, certain species to be pursued, others to be ignored. And as if to come full circle, the infrastructure development that instigated colonial exploration was instrumental in the commodification of the shrimp and other marine dwellers. The expansion of the railway facilitated overfishing and separated the places of production and consumption. In short, the railway mania, the trawler, and the price of oil present themselves as key figures in the commercial extinction discourse.

Before the commercial extinction of the brown shrimp in the Thames Estuary, the holds of trawlers were filled with prawns. The shrimp were then loaded in trucks and sent to the Special Economic Zone of Tangier-Tetouan for shelling, only to be sent back to Europe for consumption. In this case, the notion of species extinction is defined by the market, embedded in Empire's extension to extraterritorial zones in order to process resources. The freedom of the seas (*mare liberum*) governs the Special Economic Zones: freedom from labor regulations, freedom from environmental regulation, freedom from duty imposition, and freedom from international property rights, to name a few. Free Ports were the dirty, (not so) secret expansion of British colonial trade. Used as a weapon to de-industrialize occupied economies, Free Ports transformed territories into underdeveloped peripheries reliant upon resource dispossession and tariff-free trade. After the Cold War, Free Trade Zones (often the evolution of Free Ports) became a mandatory recipe and prescription from the International Monetary Fund and the World Bank to secure bailouts. Situated 15 kilometers from Europe, Tangier is the EU's faucet for flows of humans, dope, booze, real or counterfeit free-market money, gold, diamonds, and contraband. It is a sacrifice zone where many forms of death collide. [FIGs. 1 and 2]

The quantification and financialization of most human and non-human entities is a contemporary condition that can be better understood through the lens of commercial extinction. The discourse around extinction cannot be fully grasped in isolation from a critique of contemporary economic power.¹ It is also precisely these emerging modes of financially-backed death that provide insight into the multiple agents co-constituting forms of extinction.² This investigation stems from *Shrimping after Working Conditions*, which followed the brown shrimp (*Crangon crangon*) from its commercial death in the ex-fishing grounds of the Thames Estuary to the factories of the Special Economic Zone of Tangier. [FIG. 3] The project took shape in the form of two critical acts, a *fête vasière* and a peeling performance. In the former, guests were introduced to the techniques of exhaustion, by trawling themselves with hand-held shrimping nets in the shallow waters of the Thames at low tide. The performance correlated speculative investment with extinction, featuring voluntary free labor and exhaustive peeling. *Shrimping After Working Conditions* is intended to provoke a discussion about commercial extinction as a mode of exhaustion at the same time that it maintains particular biological, social, or economic conditions for life. Three figures of extinction are proposed to think *with* the notion of commercial extinction: the trawler, the railway, and oil.³ This “thinking *par le milieu*” considers extinction beyond ideas of absence, and frames dying from social or economic realms as an emergent, even operative, mode of living. [FIG. 4]

The Train of Progress

Massive infrastructure development enabled resource extraction. New excavation methods provided increasing amounts of oil to power the aggressive scouring of sea beds. Disguised as a forerunner of progress, fast economic overflows occurred in France and the UK from the eighteenth century onward; most of these took the form of speculative investments in transport infrastructure development.⁴ To illustrate the vastness of such works, 80 percent of England’s contemporary rail infrastructure and 98 percent of all contemporary inland waterway mileage was constructed during *manias*: especially, the Canal Mania, and the Railway Mania. These major developments brought forth the relationship between fossils found in specific rocks and particular arrangements of strata. Ample excavation in canals, roads, railway cuttings, and quarries left remarkably visible marks on the ground, and such grand earthworks revealed strata in escarpments, showing both the earth’s layers and the ancient creatures fossilized in them. Rocks bearing traces of beings with no association to current living ones intrigued layman and scientist alike.⁵

The timing of this gargantuan infrastructure project correlates with the foundational work of paleontologist George Cuvier’s earliest inquiries into the nature of fossils and stratigrapher William Smith’s theory of strata disposition. Smith noticed the rock layers in the pits, and postulated that strata could be found based on a predictable pattern, and identified by the fossils they contained. This became known as the principle of faunal succession. Smith’s map of 1815, “A Delineation of the Strata of England and Wales with part of Scotland,” introduced the notion of depth into the understanding of British landscape. Together with the work of Cuvier, the revelation that rocks of older formation are buried beneath substrata of more recent formation showed that history was indistinguishable from geo-history.⁶ Scientific observation was made possible by accident: the digging and dredging necessary to carry the fruits of the industrial revolution into the future revealed the nature of the geologic past.

Another consequence of this new perspective was the discovery of minerals and resources, and the fossil and strata patterns helped to predict where these might be found. At the height of England's coal-hungry Industrial Revolution, Smith's principles became an excellent companion to those who, like Roderick Murchison, were seeking to reliably locate the black burning rock. The geological knowledge that fossils afforded became a weapon of espionage and governance of both colonies and client states.⁷ Murchison is exemplary of how natural scientists collaborated with the "Empire of Free Trade" in the imperial capitalist drive for mineral resources.⁸ Their knowledge was used to determine which countries should be lured into trade agreements and to promote prospection of coal, gold, copper, and cobalt in Africa.⁹ The likes of Edmund Burke could not have foretold the awe of Congolese resource precipices and deadly escarpments now fueling the civil wars that provide for the iPhone nation.

Oceanic depths

"We do not associate the idea of antiquity with the ocean, nor wonder how it looked a thousand years ago, as we do of the land, for it was equally wild and unfathomable always". —Henry David Thoreau

The exhaustion of species for commercial purposes has endowed the maritime realm with the gift of depth. Prior to the noticeable depletion of resources, nationalist histories depicted the ocean as a non-place, a scene of the sublime, a non-exhaustible source for fish and whale-oil, or a dangerous-yet-necessary mode of transportation.¹⁰ As historian Jeffrey Bolster argues, this understanding was common mostly among scholars, who depicted the sea as boundless, or "immortal."¹¹ Commercial extinction is a particular mode of historicizing the ocean. The idea that the ocean is inexhaustible has promoted ever increasing fleet sizes, which lead to overfishing. Interestingly, the commercial depletion of species as a phenomenon predates the formulation of extinction by the natural sciences.¹² According to Carl Schmitt, it was the effects of such resource scarcity—the collapse of fisheries in European waters—that prompted European economies to develop new oceanic zones and routes, not simply the ambition of Christopher Columbus and other infamous Spanish gold-seekers.¹³ The dwindling whale count pushed fishermen to abandon the already nearly-exhausted shores of Europe to move further west across the Atlantic Ocean. The forces of scarcity lured maritime workers into higher and more distant seas. The discovery of maritime currents, the triangular trade route and the northern passage are due to the exploration that resulted from population collapse and commercial extinction.¹⁴ Thus, commercial extinction is central to Empire's expansion.

This form of extinction entails death from economic, social, or cultural realms but not from the total—and virtual—inventory of marine life. That is to say, some organisms remain, just not enough to catch commercially. It is a form a "slow death" in Lauren Berlant's terms, a "mass physical attenuation under global/national regimes of capitalist structural subordination and governmentality."¹⁵ Such modes of extinction point toward the relative and destructive nature of capital.¹⁶ While commercial extinction reduces fishing grounds to mere objects of exploitation, it also shows the very exhaustion of exhaustion. Commercial extinction may paradoxically afford the survival of a species, as is the case with *Crangon crangon* in the Thames. This unlikely post-trawling survivor underlines what most accounts of extinction fail to recognize: the failure of capitalism, in certain cases, to consume or *fulfil* extinction. It infers that a slow mode of deadening is a possible mode of life: shrimp are still there, but they are not sufficiently there for economic

control and harvest. After all, there are certain things that are systematically inherent to capitalism that cannot be extinguished entirely, such as unemployment, but perhaps also commercial extinction. [FIG. 5]

According to maritime archaeologists, the diminishing returns of certain species pushed the expansion of fishing operations away from the safety of river banks and foreshores, such as those of the Thames and the Severn, to offshore fishing.¹⁷ The business of the brown shrimp became established in the Thames Estuary, according to historical records, only after the exhaustion of more valuable species such as oysters, whelks, mussels, and winkles.¹⁸ Consequently, the taste for shrimp evolved within certain social strata due to the collapse of similar low-cost proteins. During the eighteenth and early nineteenth centuries, the oyster trade was a profitable enterprise, with beds laid from Leigh Marsh to Canvey Island, consisting mostly of deep-sea species brought from Jersey and Cancalle Bay. In 1855, nearly 500 tons of oysters were brought to London, in comparison with 50 tons of shrimp, winkles, and mussels. With ostreiculture steadily declining, in ten years those numbers reversed; 700 tons of mussels and shrimp were dispatched against 34 tons of oysters.¹⁹

Subsequently, the trade of whelks and oysters was abandoned altogether and London ate what was left from the estuary waters. Exhaustion drove demand, and eventually taste—not market whims or changing technologies.²⁰ In contrast to the extinction that drives desire for ivory to line the bloody pockets of poachers and adorn “young fashionistas in low- to middle-income brackets,” commercial extinction evades scarcity altogether.²¹ It simply moves overfishing to a new area, and theoretically repeats these efforts *ad vitam æternam*. The British were not lured toward a rare exotic dish, but rather habituated to a previously-unpalatable sea bastard out of necessity. After years of heavy trawling, commercial fishing for shrimp has now disappeared from the Thames Estuary. To blame is the dwindling density of shrimp grounds, in conjunction with sharp rises in fuel prices. Yet shrimp are nonetheless easy to come by. The same processing factories are now peeling shrimp from *elsewhere* in a globalized game of musical chairs. Commercial extinction emphasizes populations within a space of financial power and the financialization of life *outside* of scarcity. [FIG. 6]

Figures of extinction

Most species listed as commercially extinct are maritime dwellers. Meanwhile, capital has co-opted marine notions of flows, liquidity, waves, and fluctuation.²² Thus extinction, like capital and labor, tends to “exist in different spaces and times: the space of flows and the space of places, instant time of computerized networks versus clock time of everyday life,” or the ebbing and flowing time of the tide.²³ Some of the operative capacity of commercial extinction can be understood through the adoption and development of novel modes of capture and working gear. The proposed figures of this non-mythologized discourse of extinction are the trawl, the price of fuel, and the combustion engine.²⁴

Trawler

From the work of maritime historians we have learnt that it was not the search for efficiency and optimization but the diminishing profitability of fishing grounds that forced technology innovation and investment.²⁵ For instance, in the case of cod, the hook replaced the spear, the tub-trawl replaced the line, and the trawl replaced the seine-net.²⁶ Many of these developments were prompted by diminishing proceeds drawn from

the same territories. Debt was factored into extinction as newer equipment demanded larger investment and further modes of accumulation. [FIGs. 7 and 8]

The Thames shrimp-net was the earliest trawler. The beam trawl is a triangular, purse-shaped net consisting of a “head” (the frame) and a “net.” A wooden spar named the “beam,” made out of elm, holds the mouth of the net wide. The size of the beam is governed by the size of the net, the length and power of the vessel, and the nature of the catch. Timber was selected and grown according to the size and shape of the beam, as trimming or chipping would lessen its overall strength. Elm, because of its interlocking grain, is used in other parts of the vessel, such as the keel, where strength is necessary. The upper edge of the mouth of the net is secured to the beam, and the lower edge of the opening drags on the seafloor as the net is towed. The Thames shrimp-trawl introduced some developments from the standard trawl: it added a second beam below. The head is raised a short distance from the ground by two iron supports, also called “heads.” When first alarmed, brown shrimp initially bury themselves in the sand with a fan-like tail movement. However, the approaching beam—whose pounding mimics the vibratory stimulus of a predator’s presence—triggers an escape response. Springing upward, clouds of shrimps clear the bottom bar and jump straight into the net. [FIGs. 9 and 10]

Over seven centuries, the trawl’s evolution as a technical object has created thick and turbid clouds of detritus, sediment deposits, and by-catch. The trawler’s print on the seabed has widened seven-fold from the early beam-trawls of Barking, which has since developed into the contemporary otter trawl.²⁷ In the distant bays of Florida, otter trawls that catch white and pink shrimp have doors weighing 750 kilograms, and nets spanning 30 meters. The trawler has become the world’s most disruptive—and most economically productive—fishing technology. The earliest record of complaint (from 1953) regarding the *wondyrchoum* trawl, a type of beam trawl used in the Thames Estuary, grumbles that the trawler is

“...of so small a mesh, no manner of fish, however small, entering within it can pass out and is compelled to remain therein and be taken...by means of which instrument the fishermen aforesaid take so great abundance of small fish aforesaid, that they know not what to do with them, but feed and fatten the pigs with them, to the great damage of the whole commons of the kingdom, and the destruction of the fisheries in like places, for which they pray remedy.”²⁸

Shortly after the Gulf of Mexico disaster in 2010, Austrian artists Übermorgen examined the photography of British Petroleum’s (BP’s) Deep Horizon oil spill. Pointing at the abundant aerial images captured during this dramatic episode, they claimed the return of oil as “the crown of art disciplines.”²⁹ For the artists, this comeback had turned oil painting into a kind of sickly generative bio-art.³⁰ Thus, the trawlers scraping and digging through seabed life could be considered Earth’s biggest work of printmaking. Freed from the clock of the tide, trawls have left mud trails visible to satellites and carvings observable by sonar for two years.³¹ One step ahead of Andy Warhol’s famous efforts to mechanize and automatize the work of art, the trawl turns the work of mechanization and automation into art.

Railway

A second constitutive figure of commercial extinction can be found in the railway. As some historians have noticed, increases in the trawled-fish trade were correlated with the expansion of railway infrastructure.³²

More specifically, the opening of the North Sea to trawling in the nineteenth century fed on the explosive construction of railways. At first, this development offered a sense of temporal shrinkage and geographical expansion. The railway enabled more fishing grounds to become profitable as markets became larger than ever.³³ In addition, modern transportation lengthened the possible distance between the place of production and the place of consumption, which in practice commodified the shrimp.³⁴ Marx comments on the entanglement between spatial distance and the nature of commodities: modern modes of transport shape the perception of goods: in short, bringing a product to market can be regarded as the transformation of product into commodity.³⁵ The commodification of shrimp brought by the railway also increased fishing and contributed to its commercial extinction.

The expansion of the railway needed the overabundance of fresh fish that trawling could deliver; meanwhile the trawling industry craved a connection between ports and markets as well as a separation between places of production and consumption. The combustion engine aligned railways and trawlers into a single system of production. Freed from the direction of the wind, the combustion engine directed course to the market.

Oil

In the quantification of accumulation, variables can be left out, simplified, or abstracted. The Organization for Economic Co-operation and Development (OECD) measures fishing according to fleet capacity (tonnage and engine power, calculated in either GT or kW) and days at sea.³⁶ However, this formulation follows the tradition of abstracting the “mechanics of power.”³⁷ It obfuscates the source of that power. Fishing is mostly possible through the combustion of petrol or diesel. This enables vessels to travel further and for longer periods; investing in more efficient gear compensates for reductions in catch density. More recently, the agency of oil prices in the resource extraction discourse has been minimized by the decrease in fracking during times of low oil prices.³⁸

A trawler is a machine that connects and traverses several of the earth's most powerful strata: the ocean surface, the sandy bottom of the seabed, and the deep layers replete with hydrocarbons beneath the North Sea and the Middle Eastern deserts. The ocean surface now faces the imminent threat of acidification, as well as temperature and sea-level rise. The seabed is at risk from changing current circulation and the exchange of water and sediments. The unfathomable depth of geological strata and the fossil fuels they contain is a glimpse into deep history. The price paid per barrel of Brent Crude is the common element that cuts through all these layers—the price of oil constitutes a “politics of strata.”³⁹ Waves of price fluctuations encourage the pursuit of some marine species rather than others, the closure of certain routes and the opening of new ones, the collapse of oil wells in certain locales and the boring of others.

Liquid fuel also has other constitutive agencies. Petrol replaced altogether other traditional forms of power, such as cumbersome sails and, later on, steam-coal power. As fuel is formed by hydrocarbon chains of lesser complexity (and hence of higher caloric content) it produces more energy than coal.⁴⁰ Liquid fuel helped to detach horsepower from the power of a horse. Fishing boats started to process catch at sea rather than on land, turning first into kitchens, and then, with liquid fuel allowing heavier machinery on board, into factories. Following the demand for more expensive machinery, boats became more debt- and insurance-intensive. The carrying and dragging capacity of vessels increased while the crews that serviced trawlers

shrunk. Maritime workers shifted from skilled laborers, amenable to riot and mutiny, to become the expendable and work-docile bodies of industrialism. The advances of industrialization reduced them to unskilled, debt-ridden fishermen on gas-powered boats.

In addition to petrol's ability to concentrate power, its physio-chemical properties make it easier to manipulate, distribute, and store than previous forms of energy. Also, oilfields, pipelines, refineries, and pumping stations are by effect (and by design) immune to disruptions caused by organized labor, unlike the systems that governed the extraction and distribution of coal.⁴¹ The struggle against the industrial body was presented as a necessary element of the move away from coal rather than a product of much more complex geopolitical and technological developments.⁴² As a result, oil prices have determined catch, and thus oil as a material has shaped the body and livelihood of the maritime workers.

Chitin: Extinction Red

And yet, throughout this whole discussion, the ghost figure remains labor. Human automation predates the machinic. The human machines of free trade zones engage in a Sisyphean peeling loop, as revealed by organizations such as Attawasoul and the International Labor Union in 2013.⁴³ By the end of the usually 16-hour day, the shrimp meat is weighed. If the weight is less than 6 kilograms per hour, the peeler is not paid. In contrast, the four peelers who worked arduously during the *Dégustation Amère* event at The Empire Remains Shop together peeled only 200 grams in one hour. [FIG. 11] The degree of the participants' surprise at the weight discrepancy points to the ghost peeler's degree of specialization and optimization. Unlike other shrimp, the brown shrimp's small size and particularly collagen-rich shell has impeded machine peeling. Afterward, the discarded exoskeleton is demineralized and de-proteinized for the extraction of chitin—the reddish substance often used as a fertilizer or in food processing.⁴⁴ For how long will the peeler's labor resist extinction? The Dutch company Groningen Leens is investing in the development of machines that can peel even the small, brown shrimp. The very threat of machine development is already being used to bargain over labor prices within the FTZs. In other words, the possibility for labor extinction is recognized as a basis for extortion, which leads in turn to forms of social death for the workers. Perversely, the more workers peel, the less they are worth. Caught within this complexity and the entanglements between social death, speculative investment, and extinction, FRAUD invites you to peel your own shrimp.

The Peeler's Loop

Grab shrimp.

Hold the head and tail between the forefinger and thumb of each hand.

Push the head and tail ends gently towards each other thus loosening the shell from the middle of the shrimp.

Pull the shell off.

Repeat.

Fig. 1: An improvised customs office constructed out of merchandise boxes in Tangiers, the antecedent of the Free Port. From the Centre des Archives Diplomatiques de Nantes.

Fig. 2: Cork screw factory in Tangier, photographed by Jacques Belin. Belin was known for his propaganda of the French Protectorate in Tangier, with special attention to Morocco's industrial modernization. From the Centre des Archives Diplomatiques de Nantes.

Fig. 3: The commercially extinct *Crangon crangon*, close-up, caught and eaten at the *Shrimping After Working Conditions* workshop, Leigh-On-Sea (2016). Photograph by Cooking Sections.

Fig. 4: Sorting the day's catch at the *Shrimping After Working Conditions* workshop, Leigh-On-Sea (2016). Photograph by Cooking Sections.

Fig. 5: Assembling the shrimping net on The Ray in the Thames Estuary (UK). Photography by FRAUD.

Fig. 6: The last shrimp of the estuary (2016). *Crangon crangon* 3D-printed in clear SLA and white SLS resin. Photography by FRAUD.

Fig. 7: The Thames Shrimp-net, depicting the head as the frame for the purse shaped net. From E.W. Holdsworth, *Sea Fisheries* (1877), 131.

Fig. 8: Thames Shrimpers. From Holdsworth, *Sea Fisheries*, 133.

Figs. 9–10: Brown Shrimp (*crevette grise*) nets in France, from Henri-Louis Duhamel du Monceau, *Traité général des pesches: et histoire des poissons qu'elles fournissent tant pour la subsistance des hommes que pour plusieurs autres usages qui ont rapport aux arts et au commerce* (Paris: Chez Saillant & Nyon, 1769).

Fig. 11: Degustation Amere at the Empire Remains Shop (2016). Photograph by FRAUD.

¹ Ashley Dawson, *Extinction: A Radical History* (New York: OR Books, 2016).

² See Francisco Gallardo and Audrey Samson, "Shrimping Under Working Conditions" in *Executing Practices*, eds. Helen Pritchard, Eric Snodgrass, and Magda Tyžlik-Carver (New York: Autonomedia, 2017).

³ Isabelle Stengers, Erin Manning, and Brian Massumi, "History Through the Middle: Between Macro and Mesopolitics—an Interview with Isabelle Stengers," *Inflexions* no. 3 (October 2009): 184–185.

⁴ Christian Wolmar, *Fire and Steam: A New History of the Railways in Britain* (London: Atlantic Books, 2009).

⁵ According to biographical records, as a child William Smith was fascinated by the sea urchin fossils customarily used as pound weights for butter scales. See Frank Dawson Adams, *The Birth and Development of the Geological Science* (Baltimore: Williams and Wilkins, 1954), 271–272.

⁶ Dipesh Chakrabarty, "The Climate of History: Four Theses," *Critical Inquiry* vol. 35, no. 2 (Winter 2009): 197–222.

⁷ See Martin J.S. Rudwick, *Bursting the Limits of Time: The Reconstruction of Geohistory in the Age of Revolution* (Chicago: University of Chicago Press, 2005).

⁸ See Sudipta Sen, *Empire of Free Trade: The East India Company and the Making of the Colonial Marketplace* (Philadelphia: University of Pennsylvania Press, 1998).

⁹ Robert A. Stafford, *Scientist of Empire: Sir Roderick Murchison, Scientific Exploration and Victorian Imperialism* (London: Cambridge University Press, 2002).

¹⁰ Philip E. Steinberg, "The Maritime Mystique: Sustainable Development, Capital Mobility, and Nostalgia in the World Ocean," *Environment and Planning D: Society and Space* vol. 17, no. 4 (August 1999): 403–426.

¹¹ Jeffrey W. Bolster, *The Mortal Sea: Fishing the Atlantic in the Age of Sail* (Cambridge, MA: Belknap Press at Harvard University Press, 2014), 6–7.

¹² Although paleontologist Georges Cuvier is normally credited with formulating the modern concept of extinction in the late eighteenth century, earlier records show it was Robert Hooke or Thomas Molyneux who first speculated on the possibility of local extinctions or population displacements in certain species; see David Sepkoski, *Rereading the Fossil Record: The Growth of Paleobiology as an Evolutionary Discipline* (Chicago: University of Chicago Press, 2012). This claim is also based on a re-reading of the maritime texts of the historians Jules Michelet and Jeffrey Bolster. See Jules Michelet, *La Mer (The Sea)* (New York: Rudd & Carleton, 1861); and Bolster, *The Mortal Sea*.

¹³ Carl Schmitt, *Land and Sea* (Washington, DC: Plutarch Press, 1997), 16–17.

¹⁴ Schmitt, *Land and Sea*, 16–17.

¹⁵ Lauren Berlant, *Cruel Optimism*, (Durham, NC: Duke University Press, 2011), 754.

¹⁶ As opposed to Maurizio Lazzarato, who posits that it is absolute. See Lazzarato, "Extinction," *Extinct.ly*, extinct.ly/texts/#lazzarato.

¹⁷ James A. Galloway, "Fishing in Medieval England" in *The Sea in History: The Medieval*, eds. Michel Balard and Christian Buchet (Suffolk: Boydell & Brewer, 2017), 629–642.

¹⁸ Laurence A. Wells, "The Shrimp Industry of Leigh-on-Sea," *Southend Standard*, December 29, 1932.

¹⁹ N.a. (1899) "The Metropolis of Shrimp," *The New Penny Magazine*, 585–586.

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- ²⁰ Bolster, *The Mortal Sea*, 29.
- ²¹ Mark Strauss, "Who Buys Ivory? You'd Be Surprised," *National Geographic*, August 12, 2015.
- ²² Christopher L. Connery, "Pacific Rim Discourse: The US Global Imaginary in the Late Cold War Years," *boundary 2* vol. 21, no. 1 (Spring 1994): 30–56, cited in Philip E. Steinberg, *The Social Construction of the Ocean* (Cambridge, UK: Cambridge University Press, 2001), 168.
- ²³ Manuel Castells, *The Rise of the Network Society: The Information Age: Economy, Society, and Culture Volume I* (Chichester: John Wiley & Sons, 2011), 475, cited in Steinberg, *The Social Construction of the Ocean*, 68.
- ²⁴ Inspired by Elizabeth Povinelli's three figures of extinction in Povinelli, *Geontologies: A Requiem to Late Liberalism* (Durham, NC: Duke University Press, 2016), 17–19.
- ²⁵ Bolster, *The Moral Sea*, 163.
- ²⁶ The tub-trawl was an earlier iteration of the practice of long-lining. Baited lines were coiled in a tub allowing for more fish to be caught. Usually this practice was undertaken in a beach dory (a small, shallow-draft boat) that was commonly rowed.
- ²⁷ The term "wondyrchoun" is believed to come from the Dutch words for "wonder" and either "shoe" or "sock," which suggests that the net connects back to some sort of footwear customs. In an otter trawl, two doors or "otter boards" spread the mouth of the net. For further details see Frederick M. Davis, *An Account of Fishing Gears of England and Wales* (London: HM Stationery Office, 1958), 87.
- ²⁸ Edgar J. March, *Sailing Trawlers: The Story of Deep-Sea Fishing with Longline and Trawl* (London: P. Marshall, 1953), 33.
- ²⁹ Ubermorgen, "Deeeeeeeep Horizon," <http://www.deeeeeeeephorizon.com>.
- ³⁰ The number of unique forms of life benefiting from the oil spill has now been widely documented; see, for instance, Nina Dombrowski et al., "Reconstructing metabolic pathways of hydrocarbon-degrading bacteria from the Deepwater Horizon oil spill," *Nature Microbiology* vol. 1, no. 7 (July 2016). Key to the findings are a higher than expected biodiversity of polycyclic aromatic hydrocarbon-degrading bacteria, chief among them being *Alcanivorax borkumensis*.
- ³¹ The biggest trawling gear, spanning 30 meters, can technically be perceived from orbital space, as grids of 30 meters squared are the standard resolution of today's satellite systems. While trawl scars are visible to sonar, shrimp schools are generally difficult to recognize by echo-sound location because shrimp are too small a target and lack the air bladder that helps other fish be tracked. See Albert Palanques, Jorge Guillén, and Pere Puig, "Impact of bottom trawling on water turbidity and muddy sediment of an unfished continental shelf," *Limnology and Oceanography* vol. 46, no. 5 (July 2001): 1100-1110, 1105.
- ³² Robb Robinson, "The Evolution of Railway Fish Traffic Policies, 1840–66," *The Journal of Transport History* vol. 7, no. 1 (1986): 32-44.
- ³³ Wolfgang Schivelbusch, *The Railway Journey: The Industrialization of Time and Space in the Nineteenth Century* (Oxford: Berg Publishers, 1986), 35.
- ³⁴ Schivelbusch, *The Railway Journey*, 40.
- ³⁵ Karl Marx, *Grundrisse: Foundations of the Critique of Political Economy*, trans. Martin Nicolaus (New York: Penguin Books, 1993), 534.
- ³⁶ OECD, *Glossary of Statistical Terms* (Paris: OECD Publishing, 2008), 174.
- ³⁷ Michel Foucault, *Discipline and Punish: The Birth of the Prison*, trans. Alan Sheridan (New York: Vintage, 1995), 138.
- ³⁸ Timothy Fitzgerald, "Frackonomics: Some Economics of Hydraulic Fracturing" *Case Western Reserve Law Review* vol. 63, no. 4 (Summer 2013): 1337.
- ³⁹ Nigel Clark, "Politics of Strata," *Theory, Culture & Society* vol. 34, no. 2-3 (May 2017): 211-231.
- ⁴⁰ The more chemical complexity, the less energy content (when measured in unit of energy per unit of mass). Anecdotally, other than fuel, medicinal drugs have a similar correlation, where less chemical complexity induces stronger effects.
- ⁴¹ Timothy Mitchell, *Carbon Democracy: Political Power in the Age of Oil*, (New York: Verso, 2011).
- ⁴² Peter Linebaugh, *Stop, Thief!: The Commons, Enclosures, and Resistance* (Oakland: PM Press, 2014), 114.
- ⁴³ "Una más de las multinacionales en Marruecos: las fábricas de gambas de Tánger [Tangier Shrimp Factories: One of the Many Multinationals in Morocco]," *CGT Andalucía*, June 12, 2012.
- ⁴⁴ Aline Percot, Christophe Viton, and Alain Domard, "Optimization of Chitin Extraction from Shrimp Shells," *Biomacromolecules* vol. 4, no. 1 (January 2003): 12–18.