CHAPTER FOUR

Conflicts

Underneath the Quiet Waves

SIMONE M. MÜLLER

INTRODUCTION

The water's surface was at its calmest as it slowly swallowed the massive steel construction of the SS *LeBaron Russell Briggs*. Gently, the ocean's waves touched and embraced the ship's outer wall. A splash here and there, but hardly a white crest was visible and the sun sparkled and mirrored vis-à-vis itself as if to exist a thousandfold on the ocean's surface. Meanwhile, unseen by the human observers encircling the site, ocean water gushed greedily into the ship's body and through the cracks that human will had deliberately created. The explosion had been quick but massive. With brute force, it had ripped open the ship's hull to allow the water to enter. Slowly but steadily the cold saltwater filled the *Russell Briggs*' compartments and pulled the old liberty ship and its hazardous cargo ever deeper into both their ocean graves (US Naval Photographic Center 1970).

Many hundred miles out on the Atlantic, the calm marine scenery belied the great excitement that the United States Pentagon's mission CHASE had triggered on land. Cut holes and sink 'em: CHASE was an acronym for a secret military operation through which the United States rid itself of outdated chemical weapons from its stockpile, a practice common among militaries around the world. Onboard the SS *Le Baron Russell Briggs* were 418 steel jacketed, concrete vaults that encased 12,500 M55 rockets containing Sarin nerve gas

and one container of VX gas. On August 18, 1970, the US Army towed her out 282 miles east of Cape Kennedy, Florida, and scuttled the ship in 16,600 feet (4,900 meters) of water (Sherman 1972). Sunk on the ocean bottom, they hoped, ship and cargo would be out of sight, out of mind, and, ideally, also out of harm's way. Widespread concern about marine ecosystems, however, sparked an international debate on the dumping of hazardous materials that pathed the way to the passage of the London Dumping Convention in 1972. The Convention was the first UN governance format on global marine protection and CHASE 13 the last mission of its kind.

Over the course of the twentieth century, myriad conflicts have erupted on as well as over ocean space. During the century's different military conflicts, maritime space has always represented an important stage for military engagements (Lehman 2018; Morison [1963] 2007; Roy 1995; Symonds 2018). Similarly, nations, businesses, or individuals competed for the oceans' vast resources, ranging from fish to oil and minerals (Holm, Smith, and Starkey 2017; Heffernan 1981; Hook 2012; Jónsson 1982; Steinsson 2016). In the face of the voluminous global naval histories of the two world wars, the dramatic Cod Wars between Great Britain and Iceland, the Tuna Wars between the United States and Mexico, or the ongoing territorial struggle between China, Brunei, Taiwan, Malaysia, Indonesia, the Philippines, and Vietnam in the South China Sea, we easily forget about a much quieter and slower environmental conflict that is yet so pervasive to the maritime history of the twentieth century: the battle over the use of ocean space as dumping ground. The controversy whether the world ocean is pristine nature in need of human protection or an enormous dumping ground with seemingly endless assimilative capacity is integral to the rise of modern environmentalism, the growth and expansion of ocean science, as well as the disenchanting of older, mythical imaginations of the deep sea. It strongly links to questions of the costs of modern means of production and consumption-and who is bearing them-and testifies to societies' practice to externalize their waste (Lessenich 2016). Finally, the slow and yet violent environmental conflict over the use of ocean space as dumping ground is emblematic for how humans have understood what they call nature, how they define their relationship to it, and whether they see themselves as part of it.[1]

Industrial nations in particular have competed with other nations, with nonhuman actors, and with future generations over the use of the world ocean as habitat and resource on the one hand or as dumping ground on the other hand. The ocean has provided humans not only with food and mineral resources, but also with an apparently limitless capacity to assimilate an ever-growing amount of waste. In the twentieth century, various actors from militaries, municipalities, or industries purposefully turned to the world's maritime space on their search for the "ultimate sink" (Tarr 1996). Via pipelines or barges, they transported unwanted objects, such as sewage sludge, chemicals, low- and high-level nuclear

material, dredge spoils or outdated chemical weapons, out to sea to designated dumping areas. Often also simply where currents and wind would take them.

The practice of open-water dumping relied on the ocean's ability to put unwanted objects out of sight and out of reach while mitigating potential conflicts about waste dumping on land. The waters' flowing quality, its opaque nature, its depth, but particularly the ocean's vast container made it look like the perfect final receptacle. Ocean dumping seemed a natural human activity.[2] Often, a lack of data made it difficult to prove otherwise. Additionally, century-old cultural tropes about the ocean as "a sea that can wash away all evils," allowed people to consider ocean dumping as environmentally sound and harmless (Patton 2007). Questioned about CHASE, Acting-Assistant Secretary of the US Army, Charles L. Poor, explained how the military had always looked on the ocean floor "as a kind of 'Davy Jones Locker' remote and inaccessible where 'things could be put and forgotten'" (quoted in Selin and VanDeveer 2013: 499).

As of the late 1960s, people from all strata of society and all regions of the world increasingly wondered about the limits of the ocean's assimilative capacity. Due to the growth and expansion of ocean science as well as the rise in cinematic access to deep ocean life, marine space had become less of a terra incognita. Despite its primarily terrestrial focus, modern environmentalism, too, recognized a need to protect the oceans. Water's fluidity, together with the ability of other chemicals to diffuse through water, made open waters problematic disposal sites. Unwanted materials might stay hidden, but they were unlikely to stay put (Müller and Stradling 2019). In smaller waters, the practice of open-water dumping had already led to a series of dramatic and visual pollution incidences, such as the proclaimed deaths of Lake Erie, the Rhine River, and the New York Bight (Cioc 2002; Egan 2017; Langston 2017; Stradling and Stradling 2015). Soon, the ocean too might become a dead zone, so some scientists. Concern over marine ecosystems led to a series of regional and international marine protection treaties such as the London Dumping Convention (1975), the Oslo Convention (1972), the Kuwait Convention (1979), or the Abidjan Convention (1984). As of the 1990s, these transnational environmental protection governance systems covered almost all maritime regions. Yet, neither the practice of ocean dumping nor the controversies about it have truly stopped.

This chapter foregrounds the rather quiet environmental conflicts connected to ocean dumping and the slow violence inherent to it (Nixon 2011). The chapter opens with an oversight of ocean dumping practices before it discusses how century-old cultural tropes of the ocean have informed the practice of sea-dumping rendering it a seemingly environmentally harmless practice. It then introduces the different international regulations intended to protect ocean space from dumping, such as the London Dumping Convention or the Oslo

Convention. In its final section, the chapter discusses the continuous return of both drowned materials as well as the issue of dumping itself.

DAVY JONES'S LOCKER

In 1946, the US military launched a secret mission called *Operation Davy Jones Locker*. With this name, the military invoked the gruesome history of nautical superstition. From at least the eighteenth century on, Davy Jones's Locker was the idiomatic expression for the bottom of the sea. The term characterized a remote place, the reign of Davy Jones—the sailors' devil—where drowned sailors and shipwrecks were irretrievably bound never to return to the surface (Bane 2014). In 1946, the term became a euphemism for drowning hazardous waste as the US military planned to dump outdated, defect, or captured war munitions from the Second World War. Calling the operation Davy Jones's Locker signified how the military, but also a full host of groups ranging from industry, science, or local and national governance, felt about the deep-sea and marine space. Many people assumed an entitlement to use the ocean as the ultimate sink. Ultimately, so Wilson Talley of the United States Environmental Protection Agency (EPA) in 1975, the ocean was "the sink for the waste that [was] created on the land, and it was a natural choice to use it as a dumping ground" (Talley quoted in Subcommittee on the Environment and the Atmosphere 1975: 196).

Open-water dumping has its origins with earliest human settlements by water. The practice increased dramatically in the late nineteenth century with a steep rise in both quantity and toxic quality of the material following the synthetic-chemical revolution and the Second World War. The remnants of industrial production and synthetically produced consumer products, marine trade infrastructure, and urban growth found their ways into the world's seas. Municipalities dumped sewage, the corps of engineers dredge spoil, industries their chemical wastes, and the militaries outdated chemical weapons to name a few. Some of the actors dumped in coastal waters and within the national territories of the continental shelf, others beyond it in international waters. Some marked where they dumped material, many did not.

The world's militaries are probably the most clandestine actors to link the forceful conflicts of the twentieth century with what was going on more quietly underneath the oceans' waves. They accumulated millions of tons of chemical weapons ranging from artillery shells to Agent Orange. Some of these chemical warfare agents were old and abandoned, others newly manufactured and stocked over the course of an escalating retaliation and containment strategy of the Cold War (Hart 2008: 55; Müller 2016: 264, 275; Souchen 2018). The problem of all of these chemical warfare agents was that they were not made to last or to store indefinitely. Over time, many chemicals became less stable and their containers more susceptible to leaking (Christianson 2010: 132). Eventually,

the militaries needed to dispose of their stockpiles so that they were equally out of harm's way and out of the enemy's reach.

Military officials turned to the sea as the ultimate disposal ground, particularly the North Atlantic, the Baltic, and the North Sea, since these waters were easily accessible from the major battlefields. Already in the 1920s, Belgian authorities systematically collected war materials from the First World War and dumped or scuttled them on ships. Much of this dumping occurred in shallow water in an area called Horse Market (*Paardenmarkt*) in the North Sea (Hart 2008: 55). Meanwhile, the Allied Forces dropped stockpiles of captured German blister chemicals into the Mediterranean, the Irish Sea, and the Atlantic (Mitchell 2013; Peterkin 2005). With the end of the Second World War and the ordered demilitarization of Germany and Japan, ocean dumping turned into large-scale

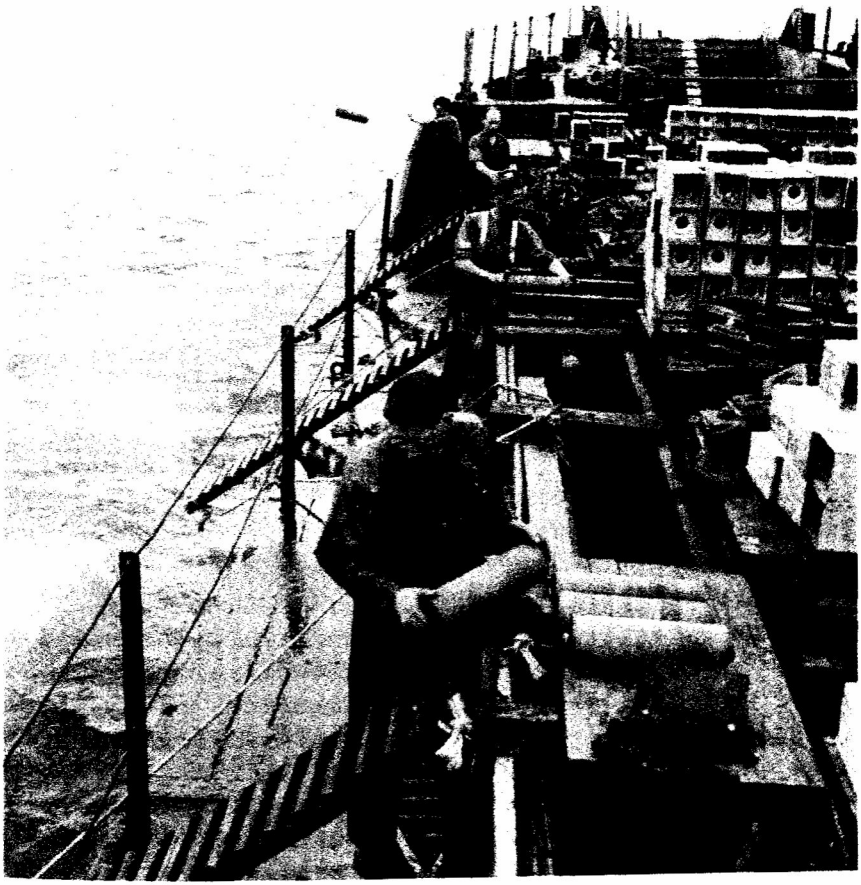

FIGURE 4.1 Members of the Royal Army Ordnance Corps place shells on gravity rollers that take the ammunition over the side of the ship and into the sea. © Imperial War Museum (IWM), H 42208.

FIGURE 4.2 Barge on its way to the ammunition dumping ground Beaufort's Dyke off Cairnryan, Scotland. © Imperial War Museum (IWM), H 42204.

operations (Arison 2014: 20). Indistinctly, British, American, French, and Russian forces dumped much of the war's remains in open water. Between 1945 and 1949, the British disposed of some 120,000 tons from their occupation zone in the Skagerrak, an area between Norway, Sweden, and Denmark that connected the North and the Baltic Seas, and sank several barges near Ireland (Figures 4.1 and 4.2). US forces, too, used the Skagerrak (Plunkett 2003a: 7). One of the greatest post-Second World War dumps occurred off the coast of South Carolina in the North Atlantic between 1946 and 1948 (Christianson 2010: 132–4). Following the Second World War, also the Pacific became a site of ocean dumpings as material was dumped off the coasts of Japan and Australia (Mitchell 2013; Plunkett 2003a: 8–12).

Many more ocean dumps happened during the Cold War. After the Korean War, the US military ordered the mass destruction of obsolete lewisite gas weapons from their stockpiles and created dumpsites about 185 kilometers off the tourist beaches of Chincoteague, Virginia, and Assateague, Maryland (Christianson 2010: 134). In the mid-1960s, the US Army launched Operation CHASE to get rid of newly aggregated stockpiles of chemical weapons in the North Atlantic (Müller 2016: 274). With the Cold War in full force, there seemed to be no end of aging and corroding weapons that eventually had to be disposed of.

Militaries were far from the only ones that looked to the sea as the ultimate dumping ground. The oldest practice of ocean dumping is probably that of sewage dumping. First with pipes leading into open water and eventually with barges, sludge dumpers usually unloaded the material at explicitly marked dumpsites. With the advent and then continued improvement of sewage treatment facilities over the course of the twentieth century, sewage contained increasing amounts of toxic substances such as cadmium, PCBs, or mercury. This in turn induced municipalities around the globe to move their sewage dumping sites further out at sea. New York City, for instance, moved from a 22-kilometer dumping site to a 196-kilometer dumping site in the mid-1980s (Subcommittee on Environmental Pollution 1985: 11). Throughout the first half of the twentieth century, municipalities, industries, and federal agencies all around the world expanded open-water dumping, for instance, in the New York Bight, the Gulf of Mexico, or the Santa Monica Submarine Canyon. By 1972, almost 250 official dumpsites existed off US coasts (122 Atlantic, 56 Gulf of Mexico, 68 Pacific) for all sorts of materials (Council on Environmental Quality 1970: 1).

Alongside sewage and other municipal wastes, a wealth of industrial wastes, such as organochlorinated compounds, PCBs, or tailings found their ways into ocean water. As of 1938, for instance, Chañaral Bay in the Pacific became the site of massive waste dumping from two Andean mines located in the North of Chile. From 1938 to 1962 alone, about 125,000,000 metric tons of tailings were dumped there. Over time, the dumping created an artificial beach ten kilometers long and covering an area larger than four square kilometers. Dumping only ceased in 1989 due to a judicial order, long after the Organisation for Economic Co-operation and Development (OECD) had classified the practice as a serious incidence of marine pollution in the Pacific Ocean (Cortés et al. 2016: 19; Paskoff and Petiot 1990). Over the course of the twentieth century, Norway became one of the largest dumpers of tailings into the ocean with seven official tailing dumping sites along its Atlantic coastline and some more in its inland fjords (Friends of the Earth Norway 2015: 2).

Dredge spoils represented the largest group of material dumped into the ocean. Dredge spoils originated from the practice of underwater removal of

debris or sediments of harbors or waterways and referred to "unconsolidated, randomly mixed sediments composed of rock, soil, or shell materials" (European Marine Observation and Data Network 2018). With the vast expansion of the shipping industry, the advent of the containership, harbors attempted to accommodate ever more and bigger ships that made dredging a regular and necessary activity. According to a US study, by the 1960s, dredge spoils accounted for about 80 percent by weight of the material dumped in open water—in the Atlantic Ocean, Pacific, and Great Lakes—rising to almost 90 percent by weight by the mid-1970s. The issue with the dredge spoils was that they contained contaminated sediments originating from older environmental abuses and agricultural, industrial, or municipal discharges into marine water. About 34 percent of the dredge spoils was polluted (Committee on Merchant Marine and Fisheries 1980: 3, 48; Council on Environmental Quality 1970: 3).

Finally, radioactive waste, too, ended up in the ocean. It came from nuclear energy, nuclear-powered vessels, industries, hospitals, scientific research centers, or nuclear weapons facilities. Prominent nuclear sites were Sellafield in the UK, LaHague in France, or Dounreay in Scotland from where the pipes with effluents usually ran directly into the sea (Hamblin 2008). Between 1946 and 1993, fourteen countries, starting with the United States, the Soviet Union, and Great Britain, and as of the 1950s also France, Switzerland, the Netherlands, Japan, New Zealand, South Korea, Italy, and Sweden (amongst others), used more than eighty sites in the Atlantic, the Pacific, and the Arctic to dispose of radioactive waste (International Atomic Energy Agency 1999: 12; Vartanov and Hollister 1997: 7). Material comprised liquid and solid wastes as well as nuclear reactor vessels, with and without fuel (International Atomic Energy Agency 1999: 6). Originally, such nuclear dumping took place solely under national authority. From 1968 onwards, the European countries moved to joint dumping operations that took place annually at the same site and were organized within the OECD's European Nuclear Energy Agency (Calmet and Bewers 1991: 417–18; Hamblin 2008: 8).

In contrast to most other hazardous material dumped into the seas and oceans, and with the exception of the Soviet Union, radioactive material was not dumped indiscriminately or without political debate (Aust and Herrmann 2013: 2). Throughout the 1950s and 1960s, the Soviet Union used the issue "as a vehicle for waging a propaganda war against the West," especially the United States and Great Britain. Ironically, while the Soviet Union raised the loudest voice of disapproval accusing the Western countries of poisoning the shared resource of the ocean, they secretly did the same. Only in the early 1990s, President Boris Yeltsin disclosed that in addition to effluent and packaged waste, the Soviet Union had dumped sixteen nuclear reactors from submarines and icebreakers, some still with nuclear fuel, most of them in water less than one hundred meters deep (Hamblin 2008: 2–3).

THE SEA CAN WASH AWAY ALL EVILS

Water covers more than 70 percent of the earth's surface. More than 90 percent of this is ocean water. Scientists customarily divide the world's ocean into several principal oceans, such as the Pacific, Atlantic, Indian, Southern (Antarctic), and Artic Oceans, as well as smaller seas, such as the Mediterranean, Baltic, or North Sea. The average marine water's depth is nearly 3,700 meters whereby mean depth can vary greatly from sea to ocean. There are bodies of water, such as the Pacific that reach a mean depth of 4,000 meters and is home to the Mariana Trench—the world's deepest point—with 10,911 meters. Then, there is the Baltic Sea that has a mean depth of only 52 meters and is much shallower than, for instance, Lake Ontario with an average depth of 86 meters (Charette and Smith 2010; Czub 2018: 1485). The world ocean, to use a term that covers all marine space, is the habitat of 230,000 known species, but because much of it is unexplored, the number of species that exist in the ocean is much larger, possibly over two million (Drogin 2009).

Although ocean science has rapidly advanced throughout the twentieth century, we still know relatively little about this vast aquatic space and the effects of human presence and interference with it (Haward and Vince 2008: 9). In the context of ocean dumping, knowledge in the form of both facts and presumptions, hard data and mythical imaginations played a key role. People have dumped all sorts of material into the seas and oceans not necessarily based on what they knew about the marine environment or potential hazards effected from dumping. Rather, they did so based on what they presumed to know about the qualities of ocean water and the assimilative capacity of sea spaces.[3] Hard data was difficult to get for both sides of the argument and many a scientific controversy was born from the conflict over the effects and abuses of ocean dumping throughout the twentieth century.

The imagination of ocean space and its vast assimilative capacities intricately linked to ancient visions of marine space as well as a cultural turn in nineteenth-century marine art and literature. Painters J.M.W. Turner and Winslow Homer, most explicitly, turned their artistic gaze away from older depictions of harbors or ships representing marine space. Instead, they pioneered with depictions of light and movement on canvas (Gillis 2013: 11). In their paintings, Turner and Homer directed their viewers' gaze to encompass the gigantic premises of the ocean, which in the literatures, too, increasingly gained attention as a space upon which to imagine modernity (Cohen 2010) (Figure 4.3). Both forms of art gave expression to a general newly awakened recognition and passion for the ocean that led to a vast expansion of humanistic and scientific knowledge of the sea "as a three-dimensional living thing with a history, geography, and a life of its own" over the course of the nineteenth and twentieth centuries (Gillis 2013: 12). At the same time, they also gave expression to a fascination with the ocean's breadth that a century later were at the core of the attraction for open water dumping.

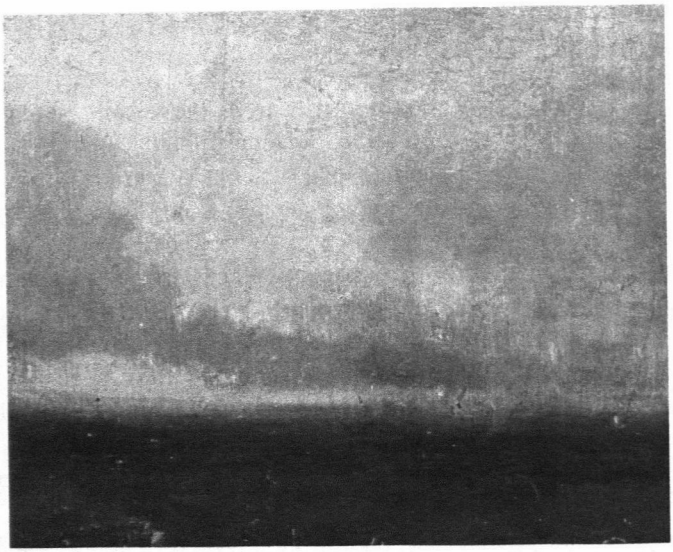

FIGURE 4.3 J.M.W. Turner, *Seascape*, 1828. © Tate.

When it came to ocean dumping, people saw the vast expanses of the ocean in relation to limited space for disposal on land. Particularly decision makers "located in crowded or geologically unstable countries with active population groups that resist land dumping," such as Japan or Great Britain found ocean-dumping attractive (Hamblin 2008: 28; VanDyke 1988: 82). For instance, when in the mid-1970s, Japan began to plan for the ocean disposal of its low-level radioactive waste, Takehiko Ishihara, director of Japan's Radioactive Waste Management Program, argued that it was "quite natural" for Japan to opt for sea disposal given the vast premises of the Pacific in contrast to Japan's limited territorial space (quoted in VanDyke 1988: 87). Similarly, New York City argued that due to the lack of adequate land for disposal within city premises it must dump its sludge into New York Bay. Sewage sludge from New York contained heavy metals that ruled out any land that could be used for agricultural usage as a potential dumping ground. Instead, the land you put it on had to be forever designated to nonagricultural use that was difficult to find in New York City (Subcommittee on Natural Resources, Agriculture Research and Environment 1981: 4). Ultimately, marine space appeared as "a logical dump site" to many decision makers, simply because there was "more ocean" (VanDyke 1988: 82; Subcommittee on Environmental Pollution 1985: 6).

In addition to the oceans' vast premises, it was the water's flowing quality that played a crucial role in the attraction of ocean dumping. Through much of human history, flowing water was the most desirable disposal site, since water flushed away wastes. As far back as the ancient Greeks, people followed Euripides'

statement that "the sea can wash away all evils." According to Kimberly Patton, throughout history, a "wide range of cultures have sacralized the sea, trusting in its power to wash away what is dangerous, dirty, and morally contaminating." They believed that the sea made "life on land possible by keeping it 'pure'" (Patton 2007: jacket). Marine pollution practices of the twentieth century were partially inherited from these beliefs.

Generally, many people followed the premise that the "solution to pollution is dilution" and the idea that large water bodies thinned down whatever was put in them through the sheer quantity of water available (Subcommittee on the Environment and the Atmosphere 1975: 101). Marine space represented an "unlimited [...] reservoir for waste assimilation," so a widespread belief up until the 1970s and 1980s (Subcommittee on Fisheries and Wildlife Conservation and Subcommittee on Oceanography 1971: 138). Scientists assumed for instance that at the dumpsite off the coast of New York City, the city's sewage sludge would, ideally, dilute by a "factor of 5,000 or more within a few minutes of dumping and by 100,000 or 1 million within 1 or 2 days." Then, the material would be "flushed out of the dumpsite in less than a week" (Subcommittee on Natural Resources, Agriculture Research and Environment 1981: 23). Industries had a similar apprehension of the ocean. The ocean had "tremendous assimilative capacity" and was a "natural and ultimate repository for waterborne residues from man and nature," so William Galloway, director of Environmental Affairs at DuPont (Subcommittee on the Environment and the Atmosphere 1975: 77). When interrogated about operation CHASE in 1971, Under Secretary of the US Army, Thaddeaus Beal, argued that "immersing" outdated chemical weapons in sea water would "dilute and detoxify the chemical agent when it escape[d] from the vaults." While the military could not guarantee that there would be "absolutely no effect on the environment at the disposal site," they believed it would be "inconsequential" (Subcommittee on Oceanography 1970). Similarly, the British Ministry of Supply justified its dumping of atomic waste in 1949 stating that its amount was "much too small to have any harmful effect on fish or human life" (British Ministry of Supply 1949, quoted in Hamblin 2008: 27). Despite a rudimentary state of knowledge, ocean dumping often appeared even to scientists, such as oceanographer Richard Fleming, as the safest, most economical, and environmentally soundest disposal method for a number of hazardous wastes, including radioactive (Bearden 2007: 8; Hamblin 2008: 29, 34).

For communities, industries, and government agencies alike, finally, the various attractions of dumping in water were "in its relative ease, its obvious convenience, and its economic efficiency" (Weinstein-Bacal 1987: 887). Historically, many cities have been located on coastlines as such a position brought with it transport, food, and ecological benefits. Products and money would flow into these cities through their ports and so nourish their growth.

Today, eight of the top ten largest cities in the world are located by the coast, among them Tokyo, Mumbai, Sáo Paulo, New York City, Shanghai, and Lagos (United Nations 2006–16). When over the course of the first half of the twentieth century, these ocean communities were facing "decreasing capacity of existing disposal facilities, lack of nearby land sites, higher costs and political problems in acquiring new sites," it was convenient to simply drop the material beneath nearby waters. As a participant at the 1966 international conference on ocean dumping pointed out, the "great economy" of discharging urban sewage, industrial wastes, or dredge spoils into near-shore waters was "inherent." If these waters could be reached "within the bounds of economy, the grim specter of an expensive treatment plant grew dimmer and dimmer, [...] to the great satisfaction to those [...] who have to pay the bill." In the end, "good old ocean [did] the job for free" (quoted in Subcommittee on Fisheries and Wildlife Conservation, Subcommittee on Oceanography 1971: 138).

TERRA INCOGNITA

Up until the 1960s and beyond, people all around the world—scientists included—presumed that open water dumping would cause no or little environmental harm to the oceans. At the same time, people harbored such presumptions often without the appropriate scientific knowledge base. Although ocean science and marine biology vastly expanded over the course of the twentieth century, both could still contribute little to a public and governance debate on the short- or long-term environmental effects of ocean dumping. What should be the discharge limits for certain materials? How should material be discharged of in the first place, at which depth and at what rate? How was the decay different for material dumped in shallow water or the deep sea? How could scientists trace contaminants such as PCBs or mercury? And how should one surveil the dumpers and monitor the dumpsites? In 1975, environmental activist Kenneth Kamlet of the US National Wildlife Federation warned that the ocean would become "a vast wasteland long before [humanity] could answer all [the] questions about natural processes and the fate and effect of pollutants in the marine environment" (quoted in Subcommittee on Fisheries and Wildlife Conservation, Subcommittee on Oceanography 1971: 26).

This lack of knowledge was often based on missing basic research related to decades of negligence, to secrecy, and to particular characteristics of the ocean itself. Up until the late 1960s, both military and civilian sources kept few records of how much they dumped or where exactly they dumped materials. To this day, the precise coordinates of many of the early dumping grounds are completely unknown. Equally, dumpers did not necessarily determine whether the material was problematic for human health or the marine environment, whether it dissolved in open water or would most likely stay put (Bearden 2007: 11). In a

time prior to satellite supported navigation, finally, many dumpers were unsure if they had released the material at the designated dumping site, since marine space was not a highway where you could easily navigate to an exact spot ("Appeal on Seabed Dumping" 1970).

Aspects of secrecy played a particularly important role in military dumping operations. Hardly ever did military agents release information on their dumpings and many records were only declassified in the new millennium (Christianson 2010: 134). A rare moment of transparency happened in 1970, when the British military admitted that a poison gas leak from their dumpings probably caused the death of more than 17,000 seabirds on the shores of the Irish Sea the year before. Another when the US military had to report about its CHASE missions before US Congress that same year (Anable 1970; Furphy, Hamilton, and Merne 1971: 34–40). Only in 2001, however, the public learned that US disposal of chemical weapons in the ocean until 1970 had been more common and widespread geographically than acknowledged. The Pentagon also reported that some of the weapons dumped had been damaged or leaking at the time of disposal (US Army Research, Development and Engineering Command, Historical Research and Response Team 2001). In 1997, a public outcry ran through Great Britain when people learned that—contrary to past statements—also Beaufort's Dyke in the Irish Sea had been used as a dumpsite for the country's radioactive waste ("Radioactive Waste was Dumped in Irish Sea" 1997).

Matters looked equally bleak on the civilian side, if for different reasons. When in 1971, the United States started considering marine protection as one of the first nations around the globe, none of their experts knew "the volume [...] of wastes that [had] been dumped in the oceans in the past years" (Subcommittee on Fisheries and Wildlife Conservation and Subcommittee on Oceanography of the Committee on Merchant Marine and Fisheries 1971: 1). The Council on Environmental Quality could only go back as far as 1968—two years—by estimating that the United States had dumped about 48 million tons at sea that year alone (1970: 1, 10) (Figure 4.4). One of the problems was that questions on the effects of ocean dumping had "scarcely" been asked "and then only by an obscure group of scientists, known as ecologists" (Subcommittee on Fisheries and Wildlife Conservation and Subcommittee on Oceanography of the Committee on Merchant Marine and Fisheries 1971: 1). When in 1972, the United States passed the Marine Protection, Research and Sanctuaries Act, also known as the Ocean Dumping Act, it did so "recognizing that little was known of the assimilative capacity" and demanded to both "strictly limit or prohibit" ocean dumping and to expand oceanic research (Lee [1981] 1983: 1).

Knowledge gaps continued to exist after first national and then international marine dumping regulations were in place and research programs established. Assessing the situation in 1975, ocean activist Kenneth Kamlet concluded that

FIGURE 4.4 Barge loaded with ashes on its way to ocean dump 05/1973. © US National Archives College Park, photo no. 412-DA-5412.

serious information deficits were still as valid as prior to the London Dumping Convention (1972; ratified in 1975). Scientists struggled to separate the effects of ocean dumping from the broader issue of marine pollution (Subcommittee on the Environment and the Atmosphere 1975: 50). Meanwhile the amount of sewage sludge or dredge spoils dumped into the ocean steadily increased. In 1973, the United States had dumped 4.3 million tons of sewage sludge; in 1982, 7.3 million tons. By 1982, ten years after the country's Ocean Dumping Act, "almost a decade of research" had not offered policy makers "cohesive data upon which to evaluate current and proposed ocean dumping policies" (Lee [1981] 1983: 1). Researchers urged governments to fund more basic science while admitting that such kinds of research tended to be painfully slow (Subcommittee on the Environment and the Atmosphere 1975: 170).

The dumping of radioactive waste was the first kind of sea disposal that triggered calls for emission standards and thresholds. In the early 1950s, the US Atomic Energy Commission and the US National Bureau of Standards both pressured oceanographer Richard Fleming to define thresholds of safety for the ocean dumping of radioactive waste. Initially, the oceanographer struggled with the task. There was "so little known about the effects and he was uncomfortable with the idea that radioactive waste would safely disappear into the oceans without significant consequences." Despite lacking data, Fleming settled in

the end for a document recommending that "surely, some radioactive waste could be put into the sea" (Hamblin 2008: 11). Considering the precise amount of this ominous *some*, scientists at the time followed the critical pathways approach presuming that if levels were safe for humans they were safe for marine organisms. Consequently, discharges should be limited by the pathways by which levels of radioactivity could reach humans in a specific environment. Marine space was not worthy of protection in itself, only in so far as it concerned humans (219).

Following up on Flemming, the Commission of the European Communities inaugurated Project Marina to assess the radiation exposure to Europeans in the seas around Northern Europe in 1985 (Hamblin 2008: 252). Yet, despite the beginning of some more meticulous monitoring, many questions concerning the effects of, for instance, radioactive waste dumping, remained unanswered. In the late 1980s, scientists were puzzled that sea anemones from one of the main Atlantic dumpsite in the outer Bay of Biscay sampled in 1979 had strontium-90 and cesium-137 concentrations at least ten times higher than those found in samples taken in 1966, although the use of the site had been discontinued in the meantime. One possible explanation was that adverse effect simply might have taken years before they appeared. Yet, studies done at that particular dumpsite were "far too sketchy to give definite answers" and prior inaccuracy about the amount and location of dumped material haunted later scientists. At the time, they also could not conclude on the question of what had happened to the waste. In the end, they warned that because of the legacy of the pre-1970s era and their still "limited knowledge about [marine ecosystems], disturbances [were] not likely to be noticed unless they [were] 'enormous'" (VanDyke 1988: 91). Instead of filling their existing knowledge gaps, however, the opposite happened. In 1993, the members of the London Dumping Convention voted on a total ban on radioactive waste disposal at sea, to be reevaluated every twenty-five years. With this decision, they also terminated accompanying research programs monitoring existing dumpsites (Aust and Herrman 2013: 9).

PROTECTING THE OCEAN

The danger of dumping material at sea became apparent when in the 1960s and 1970s the reappearance of dumped material intersected with the rise of modern environmentalism, a series of marine environmental catastrophes, and an older legacy of underwater imagery that made it possible for the average person to peak beneath the oceans' waves. All four factors allowed the terrestrial human beings to *feel* connected to the vast habitat that covered much of the planet (Alaimo 2014: 188).

The golden age of underwater moving images started in the 1930s with a host of technological and scientific innovations that allowed divers and photographers

to capture the vast richness of underwater life. After the war, it penetrated society. In 1956 Jacques-Yves Cousteau's film *The Silent World* reached audiences all around the globe with its vivid colors of a highly diverse underwater world (Cohen 2018: 81). Almost at the same time, marine biologist and writer Rachel Carson published her book *The Sea Around Us.* In 1953, its film adaptation won the Oscar for best documentary (Carson [1952] 1961). These works not only illustrated the richness of the vast ocean, but also stressed the importance of preserving it and although modern environmentalism of the 1960s and 1970s primarily focused on terrestrial issues, Cousteau and Carson had laid the seeds to an awareness that the marine environment, too, was in need of protection. A series of high-profile maritime accidents and events drew attention to the need to govern marine protection internationally. In 1967, the wreck of the oil tanker *Torrey-Canyon* off of the British coast illustrated the vulnerability of wetlands. The 1969 Santa Barbara oil spill only underlined the message (Simcock 2010: 29).

Ocean dumping came under first scrutiny when drowned objects reappeared. Not all of the dumped munitions, for instance, remained truly out of reach. Generally, chemical weapons agents are denser than sea water and so tend to remain on the ocean floor rather than float to shallower waters (Bearden 2007: 9). Repeatedly, however, they washed ashore or were accidentally retrieved as in the shallow waters of the Skagerrak and the Baltic Sea. Over the course of 1968 to 1970, several reports were filed in the Scandinavian countries from swimmers and fishermen receiving burns, apparently from mustard gas leaking out from seabed dumps. West German fishermen were temporarily blinded after they had hauled up an odd canister and five children playing with seaweed near Lübeck had received skin burns (Anable 1970).

Chemical warfare agents were not the only objects to resurface. In 1975, US Senator Lautenberg related to Congress his experience of flying over the New York Bight and witnessing the residues of sewage sludge that remained even after a long time in the ocean as well as the "mutated marine life" (Subcommittee on Environmental Pollution 1985: 7). Another issue with sewage sludge was the slime that formed from a mixture of natural mud bottom, human hair, fibers from sanitary napkins, and varieties of treated sewage. Fishermen reported how it entwined with their nets or occasionally would even tear their nets apart. At points, they had found the slime as far as 130 kilometers from the coast (27). With these reports about reappearing materials, it dawned upon people that objects—while drowned—were unlikely to stay put. In its 1977 film *Empire of Ants*, Hollywood took up a simmering fear about the potential effects of such reappearances from their ocean graves, centering their storyline on a washed-up canister of radioactive waste producing a colony of enormous ants in the Florida Everglades (Hamblin 2008: 3).

The reappearance of dumped material triggered a full host of responses from marine nations all over the world in order to mitigate the dawning conflict between those favoring and opposing ocean dumping. In the 1960s West Germany, for instance, launched an operation to locate and detoxify poison gas from the Second World War that had been dumped in the Baltic Sea. They fished some of them from the bottom to move them to deeper dumping grounds in the Atlantic (Anable 1970; "Gas Wells Moved" 1960: March 9; Helcom 2018). In 1968, with the launch of the German vessel *Matthias I*, West Germany and other European nations turned to ocean incineration as an alternative method to ocean dumping. Ocean incinerated materials were largely organochlorine wastes that were difficult and costly to dispose of on land. By 1973, the quantity of wastes annually incinerated were over 80,000 metric tons. By 1981, the number had increased to 117,000 metric tons. All incinerator ships operated in the North Sea (Suman 1991: 562–3). The turn toward ocean incineration was the first step away from understanding the deep sea as *empty space* where all sorts of material could be dumped indiscriminately.

Australia, in contrast, responded more rigorously and much earlier than any other nation across the globe to the reappearance of ocean dumpings. As early as the 1920s, pollution was washing up on beaches around Sydney as well as around Melbourne and Adelaide. Ships routinely discharged loads of garbage just off the coast. In Sydney this waste included offal, organic refuse, waste collected by municipal councils, and ashes. In addition to being a pollution nuisance, such sea-disposal also caused net-snagging problems with Australia's recently established deep-sea trawling industry and possible obstruction of the increasingly busy navigation routes. To combat pollution, Australia's federal government introduced the Beaches, Fishing Grounds, and Sea Routes Protection Act of 1932 to control the dumping of boats and to prohibit the dumping of "any garbage, rubbish, or organic refuse" in designated exclusion zones. The Australian legislation was enacted some forty years before there were any international moves to control sea dumping (Bearden 2007: 9; Plunkett 2003a: 7).

Internationally, environmentalists and governments alike started considering that also the vast ocean needed protection irrespective of human presence or dependence in the late 1960s when news broke of Operation CHASE. "More than just a few startled squid [had] been stirred" about the Pentagon's plan to dump 22,000 tons of poison gas munitions into the North Atlantic (Anable 1970; Müller 2016). The British government officially informed the United States of "mounting concern" acting on behalf of the governments in the Bahama Islands and Bermuda ("Britain Voices Concern on Nerve Gas" 1970). Iceland, which by way of the Gulf Stream had a direct connection with the dumpsite off the coast of Florida, complained to Washington that nerve gas would "harm

her fisheries." Additionally, Iceland used the United Nations Committee on the Peaceful Uses of the Sea-Bed to push for an international conference to draw up a treaty preventing pollution of the marine environment. Led by Iceland, the committee appealed to all governments to "refrain from using the seabed and the ocean floor as a dumping ground for toxic, radioactive and other noxious materials" ("Iceland Calls for a Parley To Bar Pollution of Seabed" 1970). It was the first step toward the London Dumping Convention of 1972.

While nations around the world were resenting the American ocean dumping mission, operation CHASE stirred anxieties that were already close to the surface. In Europe, people had become astutely aware that not only the North Atlantic but also their own waters were far more polluted with dangerous chemicals than experts at the time had realized. Otto Kinne, head of Helgoland's Marine Biology Research Station, called the North Sea "the industrial cesspool of Europe." He documented that some 1,200 tons of sulfuric acid a day were dumped within twenty-two kilometers of his station. Journalists further uncovered the story of a cannery that disposed 18,000 tons a formalin a year off the coast of Norway. Similarly, oceanographers stated that similar pollution was behind the fact that the Baltic's bottom waters are what they called "dead" (Anable 1970). On the other side of the world, in Japan, public concern mounted regarding dangerous discharges from factories, including cadmium and mercury, into Tokyo Bay and other waterways (Müller 2017).

Over the course of a year, a worldwide consensus had developed that ocean dumping was an issue of great concern for the entire community of nations. When in September 1971, the *Stella Maris* attempted to dump 650 tons of toxic chemicals in the North Sea, opposition from Norway, Iceland, Ireland, and the United Kingdom forced the Dutch freighter to return to its homeport (Simcock 2010: 29; Suman 1991: 562). That same year, Norway invited a group of European nations to attend the Oslo Conference to draft the first international dumping convention. On the other side of the Atlantic, the United States prepared its Marine Protection, Research, and Sanctuaries Act, better known as the Ocean Dumping Act, which it passed in October 1972 (Weinstein-Bacal 1987: 898). After a series of conferences in London, Ottawa, Reykjavik, and Stockholm, eighty nations adopted the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, generally called the London Dumping Convention, in December 1972 within the UN framework. On August 30, 1975, it entered into force (Chasek 2010: 58–9; Hassan 2006: 80).

In the early 1970s, these different dumping conventions established a regime of marine protection from ocean dumping while recognizing that the ocean could also assimilate certain material. They neither prohibited ocean dumping nor banned all material. The London Dumping Convention (LC), for instance, works with a regulatory structure based on black and gray lists. On the black

list—prohibited—you find materials such as high-level radioactive wastes, and chemical and biological warfare agents, concentrated heavy metals, and synthetic chemicals. Dumping of substances on the gray list, such as sewage sludge or dredge spoils, in turn, is possible after the dumper has obtained a special permit (Suman 1991: 568; Zeppetello 1985: 620). In 1996, members of the London Convention adopted the 1996 Protocol (LP), which updated and improved the LC and should eventually supersede it. On March 24, 2006, ten years after its adoption, the LP entered into force (Hong and Lee 2015).

One important aspect to the London Convention is the encouragement of member states to develop regional agreements to prevent ocean dumping. The first of such regional agreements was the Oslo Convention that was negotiated in February 1972, even prior to the London Convention. In 1992, the Oslo Convention was updated through the OSPAR convention (Du Pontavice 1973: 126; Suman 1991: 564; UN 2017b: 380). In 1974, those nations bordering the Baltic Sea adopted the Helsinki Convention. Similarly, the deteriorating ecological state of the Mediterranean Sea brought fifteen countries bordering this body of water to sign the Convention for the Protection of the Mediterranean Sea Against Pollution (Barcelona Convention) in 1976. It entered into force two years later (Suman 1991: 569–71). As Table 4.1 below illustrates, several more regional conventions on the protection of marine environments from pollution and ocean dumping entered into force in the 1980s or updated existing conventions in the 1990s. Today, most nations are part to one or several of these conventions that relate to sea dumping. Among the exceptions are some of the largest twenty economies of the world as well as some of the Pacific Island nations that while suffering the most from the effects of radioactive waste dumping argue that the different conventions were not strong enough (UN 2017b: 382; VanDyke 1988: 86).

TIDAL RETURNS

At the end of the twentieth and the beginning of the twenty-first century, we witness yet another turn in the long history of ocean dumping, a chapter that is characterized both by continuities as well as changes. To this day, ocean dumping is still a legal and common practice. To this day, it also remains difficult to assess the amount or the effects of it based on a lack of data on the dumpsites, knowledge about the deep sea and its marine environment, as well as a reluctance of the international community to face these two issues. The London Dumping Convention and the London Protocol, for instance, both ask their member states to submit annual reports on their ocean dumping activity. Most member states are not responsive. From the reports submitted, we learn that the largest amount of material ocean dumped are still dredge spoils, while the amount of sewage sludge has declined as nations recognized

Table 4.1 Existing International and Regional Ocean Dumping Conventions.

Name of Convention	Area of Concern	Date of Adoption	Date of Entry into Force
Oslo Convention	North Sea and Northeastern Atlantic Ocean	February 15, 1972	April 7, 1974
London Convention	Worldwide	December 19, 1972	August 30, 1975
Helsinki Convention	Baltic Sea	March 22, 1974	1974
Barcelona Convention	Mediterranean Sea	February 16, 1976	February 12, 1978
Kuwait Convention	Persian Gulf, Gulf of Aman, and North Arabian Sea	1978	1979
Abidjan Convention	Marine environment of the Atlantic coast of the West and Central and South African Region	1981	1984
Lima Convention	Southeast Pacific	1981	1986
Jeddah Convention	Red Sea and Gulf of Aden	1982	1985
Cartagena Convention	Marine environment of the wider Caribbean environment	1983	1986
Bucharest Convention	Black Sea	April 1992	1994
OSPAR	North East Atlantic	1992	1998
London Protocol	Worldwide	1996	2006
Antigua Convention	Marine and coastal environment of the Northeast Pacific	November 14, 2003	August 27, 2010

that this material was a potential contributor to eutrophication problems (UN 2017: 383). Similarly, while new technologies are available many ocean dumpsites, such as those harboring radioactive waste from OECD countries, have not been monitored regularly and over a long period of time (Aust and Herrmann 2013: 9).

At the same time that there exists this reluctance to face the ocean, in particular over the last decade of the twentieth century, several nations have started to physically revisit their ocean dumpsites with new equipment and technology, taking an interested peak underneath the water's surface. When it came to chemical weapons in particular as of the 2000s, actors all around the world started attempts to map existing dumpsites and catalog what and how much the different militaries around the world had dumped where. One of these location projects is carried out by the Baltic Marine Environment Protection Commission (HELCOM), another by OSPAR (UN 2017: 384). Often, it is the militaries themselves that want to know more about what rests underneath the ocean's surface (Plunkett 2003b). Information is compiled with an eye toward proper monitoring and—if possible—remediation, yet little has been concluded so far. The question of who should be responsible for the cleanup of disposal sites and how liability could be enforced is complicated by several factors, such as the passage of time, the commonality of the practice, the connection of dumping activity to the conduct of war, or safety and engineering issues (Baine 2004: 2).

Similarly, also the question of radioactive waste dumping has vehemently returned to the surface twice since the 1990s. First, when after the end of the Cold War in 1992, the Soviet Union disclosed that it had dumped large amounts of high-level radioactive waste into shallow waters of the Arctic Ocean since the 1960s. Concerns mounted particularly among those countries with an Arctic shoreline. A Norwegian-Russian committee was formed to investigate radioactive contamination at the dumpsites and a team of scientist undertook several excursions to the respective sites, taking samples from the ocean bottom and sea water (UN 2017: 384). Second, when in 2011 the accident at the Fukushima nuclear power station again raised public awareness of contamination of the ocean through radioactivity. It put the monitoring of dumpsites back on the agenda of the different marine protection conventions (Aust and Herrmann 2013: 9). Pressure to reinvestigate the issue mounted further when public protests opposed the dumping of the radioactive material from the fall-out. The general debate on ocean dumping remained static after Fukushima if compared to earlier discussions and controversies over the course of the twentieth century (O'Connor 2017).

Over time, people have found many arguments for and against the practice of dumping waste in the ocean. Essentially, they circle around what marine scholars W. Jackson Davis and John VanDyke had made out already in 1982 to be the major controversies: (1) the oceans are a living, interconnected environment that can return wastes to humans via the ocean food chain; (2) the ocean is a formidable environment, destructive of human structures such as radioactive waste containers; (3) despite recent rapid strides in the

oceanographic sciences, the ocean is still largely an unknown environment; (4) the ocean represents a global resource, the birthright of all people and all generations; and (5) damage of this global commons by a minority of people is contrary to principles of international law (1982). To this day, we have found no profound answer to any of these five controversies that render the issue of ocean dumping into a Flying Dutchmen bound to continually return to the table of political debate and social and environmental controversy. It remains a conflict yet to be resolved.