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NEO-MALTHUSIAN ENVIRONMENTALISM, WORLD FISHERIES CRISIS, AND THE GLOBAL COMMONS, 1950s–1970s*

FABIEN LOCHER
CNRS, Paris

ABSTRACT. *The present article aims to analyse the role played by US neo-Malthusians in the construction of overfishing as a global environmental issue. Its main argument is that this group of thinkers and militants made decisive contributions, between the 1950s and 1970s, to the formulation and dissemination of the diagnosis of a global fisheries crisis threatening the planet's stocks. These warnings about a global fishing crisis paved the way for present-day concerns about a planetary decline of marine life. By assessing the role played by the neo-Malthusians, this article analyses the history of the post-Second World War debates on ocean productivity, 'unconventional' fisheries, and fisheries exhaustion, showing how they were marked by highly optimistic expectations regarding the exploitation of the 'ocean frontier'. For the neo-Malthusians, it was crucial to discredit this cornucopian vision of the ocean as a horn of plenty, itself a result of contemporaneous euphoria in the world of industrial fishing. In conclusion, this article sheds new light on the history of debates about (over)population and world resources, and on the rise of an 'environmentalism of the oceans' in the second half of the twentieth century.*

I

Thinking of the planet as a whole and anticipating its future, humans included, is at the heart of a new sense of globality that consolidated in the later twentieth century. The existence of forms of planetary consciousness is by no means exclusive to the post-war years or even the twentieth century.[1] Yet this globality does present unique features which have been highlighted in recent research.[2]

Centre de Recherches Historiques, EHESS, 54 Boulevard Raspail, 75006 Paris flocher@ehess.fr

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[1] Alison Bashford, *Global population: history, geopolitics, and life on Earth* (New York, NY, 2014), pp. 355–6.

[2] Rens Van Munster and Casper Sylvest, eds., *The politics of globality since 1945: assembling the planet* (London and New York, NY, 2016); Paul Warde and Sverker Sörlin, 'Expertise for the

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First, it was informed by the development and increased capabilities of technoscience: the dramatic development of earth and life sciences generated a novel, systemic understanding of the planet.[3] At the same time, technological and scientific breakthroughs permitted the emergence of new forms of military action and a boom in industry and agriculture, which in turn were responsible for an intensification and globalization of the impact of human activity on the environment.[4]

Second, this sense of globality is distinguished by its future-oriented character: the planet Earth is an entity which is understood, above all, predictively. The role played by future thinking in the intellectual and political scenes of the Cold War decades is increasingly well documented.[5] While displaying great epistemic and political diversity, this mode of thinking focused on the existence of *global* threats. It played an essential part in structuring a contemporary globality by giving rise to a whole set of conceptions about possible common futures that would be disastrous for humankind.[6] Between the 1950s and 1980s, two global threats were intensely discussed. First, at a time of tension between the two blocs, the development and deployment of nuclear weapons presented unprecedented dangers.[7] The devastated landscapes of Hiroshima and Nagasaki looked like scenes from a dystopic future. Predictions produced during the Cold War by think-tanks such as the RAND Corporation forecast mutually assured destruction which, even if theoretically acting as a deterrent to nuclear war, posed a great threat to the planet.

The second global threat was damage to what, in the late 1940s, started to be called the 'environment'. This concept, a consolidation of physical and biological realities hitherto considered independently, was a warning against the

future: the emergence of environmental prediction c. 1920–1970', in Jenny Andersson and Eglė Rindzevičiūtė, eds., *The struggle for the long-term in transnational science and politics: forging the future* (New York, NY, and London, 2015), pp. 38–62.

[3] John Cloud and Judith Reppy, eds., *Social Studies of Science*, 33 (2003), special issue 'Earth sciences in the Cold War'; John Cloud, 'Imaging the world in a barrel: CORONA and the clandestine convergence of the earth sciences', *Social Studies of Science*, 31 (2001), pp. 231–51; Jacob Hamblin, *Oceanographers and the Cold War: disciples of marine science* (Seattle, WA, and London, 2005); Spencer R. Weart, *The discovery of global warming* (Cambridge, MA, 2003); Paul Edwards, *A vast machine: computer models, climate data, and the politics of global warming* (Cambridge, MA, 2010).

[4] This is the 'great acceleration' described by earth-science specialists: see Will Steffen et al., 'The trajectory of the Anthropocene: the great acceleration', *Anthropocene Review*, 2 (2015), pp. 81–98. For a recent historical analysis of this change of scale, see John R. McNeill and Peter Engelke, *The great acceleration: an environmental history of the Anthropocene since 1945* (Cambridge, MA, 2016).

[5] Andersson and Rindzevičiūtė, eds., *The struggle for the long-term*; Jenny Andersson, 'The great future debate and the struggle for the world', *American Historical Review*, 117 (2012), pp. 1411–30.

[6] Jenny Andersson and Sibylle Duhautois, 'Future of mankind: the emergence of the global future', in Van Munster and Sylvest, eds., *The politics of globality since 1945*, pp. 106–25.

[7] For an overview, see Spencer R. Weart, *The rise of nuclear fear* (Cambridge, MA, 2012).

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degradation of Earth ecosystems through human activity – soil erosion, water scarcity, decline in wildlife populations, pollution. It ultimately pointed to the looming prospect of humanity's destruction of its own habitat.

Recent historiography has revealed the dense and complex relationship between the perceptions of nuclear and environmental threats. Protest against nuclear testing played a key role in the emergence of public awareness of environmental hazards as early as the 1950s.[8] In the United States and the Pacific, denunciation of the effects of these tests worked as a collective learning process about new forms of activism and the notions of ecosystem and food chains. It is no coincidence that in *Silent spring*, Rachel Carson used the example of Strontium-90, a radioactive isotope created by nuclear testing, to explain the effects of DDT to her readers.

The nuclear power and weapons issue also played a key role in the emergence of scientific environmental expertise. The study of radioactivity, both as a phenomenon and a tracer, was instrumental to the development of ecosystem science in the United States. And today's climate change diagnosis has been prepared by decades of research – funded by the US national-security state and often classified – on the effects of nuclear explosions on the planet's atmosphere and climate.[9] The nuclear-winter debate of the early 1980s gave a glimpse of these connections. It was shaped by both the nuclear and environmental (climatic) threats of future devastation.

Between the 1950s and 1970s, neo-Malthusian thinkers and activists played an important part in the construction of the sense of globality conveyed by the 'global environment' notion. In the last few years, a series of studies has thoroughly updated our knowledge about twentieth-century Malthusianism. Alison Bashford has demonstrated the key role played by political debates and struggles in the interwar years and the early Malthusian concern for geopolitical challenges related to international security, migrations, colonial, and postcolonial issues.[10] Thomas Robertson and Matthew Connelly have studied the

[8] Toshihiro Higuchi, 'Atmospheric nuclear weapons testing and the debate on risk knowledge in Cold War America, 1945–1963', in John R. McNeill and Corinna R. Unger, eds., *Environmental histories of the Cold War* (Washington, DC, 2010), pp. 301–22; Ralph H. Lutts, 'Chemical fallout: Rachel Carson's Silent Spring, radioactive fallout, and the environmental movement', *Environmental Review*, 9 (1985), pp. 210–25; Jacob Hamblin, *Poison in the well: radioactive waste in the oceans at the dawn of the nuclear age* (New York, NY, 2008).

[9] Matthias Dörries, 'The politics of atmospheric sciences: "nuclear winter" and global climate change', *Osiris*, 26 (2011), pp. 198–223; Joseph Masco, 'Bad weather: on planetary crisis', *Social Studies of Science*, 40 (2010), pp. 7–40. For a popular treatment, see Jill Lepore, 'The atomic origins of climate science: how arguments about nuclear weapons shaped the debate over global warming', *New Yorker*, 30 Jan. 2017.

[10] Bashford, *Global population*; Alison Bashford, 'Population, geopolitics and international organizations in the mid-twentieth century', *Journal of World History*, 19 (2008), pp. 327–47; Alison Bashford, 'Nation, empire, globe: the spaces of population debate in the interwar years', *Comparative Studies in Society and History*, 49 (2007), pp. 170–201. On interwar Malthusianism, see also Gregory T. Cushman, *Guano and the opening of the Pacific world: a global ecological history* (New York, NY, 2013), pp. 189–204.

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development of post-war Malthusianism in the United States, focusing on its closest ties with the global Cold War context.[11] Malthus studies have now become a highly dynamic and diverse research field.[12]

The present article aims to contribute to this field by analysing the role played by US neo-Malthusians in the construction of overfishing as a global environmental issue. Though such thinkers and activists as Fairfield Osborn, Paul Ehrlich, Garrett Hardin, Georg Borgström, William and Paul Paddock, and Lester Brown were not direct experts on halieutic questions, they made decisive contributions, between the 1950s and 1970s, to the formulation and progressive dissemination of the diagnosis of a global fisheries crisis threatening the planet's stocks.

They were the leading figures of a specific subcurrent of the US environmental movement: instead of denouncing ecological destructions provoked by the search for profit or the modernist *ethos*, they stressed the impact of rapid population growth (in the US and in the world as a whole) on a looming exhaustion of natural resources.[13] They were heavily influenced by Malthus's original writings that they would often depict as a forerunner of their own diagnosis on the state of the planet.[14] Their neo-Malthusianism mixed Malthus, Darwinian evolutionism, and scientific ecology, contextualized by geopolitical insecurity on the one hand and global poverty on the other. For these thinkers, overpopulation could cause fierce competition for resources and, in this Cold War era, incite local or even global military conflicts.

From the end of the 1950s, they passed on warnings concerning global overfishing from fisheries and marine biologists while at the same time reformulating and embedding these warnings in a more general discourse on the state of the planet. In so doing, they positioned themselves as 'meta-specialists' – a function whose crucial role in the rise of twentieth-century global environmentalism has recently been underscored.[15]

[11] Matthew Connelly, *Fatal misconception: the struggle to control world population* (Cambridge, MA, 2010); Thomas Robertson, *The Malthusian moment: global population growth and the birth of American environmentalism* (New Brunswick, NJ, 2012); Thomas Robertson, '"This is American Earth": American empire, the Cold War, and American environmentalism', *Diplomatic History*, 32 (2008), pp. 561–84; Thomas Robertson, 'Total war and the total environment: Fairfield Osborn, William Vogt and the birth of global ecology', *Environmental History*, 17 (2012), pp. 336–64. On post-war US Malthusianism, see also John H. Perkins, *Geopolitics and the green revolution: wheat, genes, and the Cold War* (New York, NY, 1997); Björn-Ola Linnér, *The return of Malthus: environmentalism and post-war population-resource crises* (Isle of Harris, 2003); Fabien Locher, 'Cold War pastures: Garrett Hardin and the tragedy of the commons', *Revue d'histoire moderne et contemporaine*, 60 (2013), pp. 7–36.

[12] See for instance the contributions in the recent volume by Robert J. Mayhew, *New perspectives on Malthus* (Cambridge, 2016).

[13] See Robertson, *The Malthusian moment*, pp. 4–12.

[14] Garrett Hardin has even republished Malthus's texts in his volume *Population, evolution and birth control: a collage of controversial ideas* (San Francisco, CA, 1969), pp. 4–16, 137–8, 186–7.

[15] Warde and Sörlin, 'Expertise for the future', p. 50.

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Overfishing is one of the great environmental issues of our time. The diagnosis of a global fisheries crisis and subsequent calls to action are omnipresent in scientific, political, diplomatic arenas and the media. However, the place of overfishing and fish stock depletion in the history of twentieth-century environmentalism is poorly understood.[16] The historiography of environmentalism underlines the rise, in the 1960s and 1970s, of a new form of sensitivity in public opinion and governments in favour of the protection of the sea. But these researches focus on two issues distinct from overfishing: pollution of the seas and especially the coasts,[17] and public protests against whale hunting.[18] In comparison, the history of warnings about the dangers of overfishing has been largely ignored. This is all the more striking since the environmental history of fishing, fisheries, and exploitation of marine living resources itself has developed rapidly over the last decade.[19]

II

On 21 April 1967, a young American entomologist, Paul R. Ehrlich, made a presentation during a debate organized by the Commonwealth Club of California. Its title was 'The food from the sea myth'.[20] Ehrlich was not yet famous, but *The population bomb*, the neo-Malthusian bestseller published a year later, would make him so.[21] Since his first exposition on demographic questions, in 1965, Ehrlich's convictions quickly gathered strength. His analysis of

[16] One can find some elements, however, in John McCormick, *Reclaiming paradise: the global environmental movement* (Bloomington and Indianapolis, IN, 1991), pp. 79–80, and in Ian G. Simmons, *Environmental history* (Oxford, 1993), pp. 111–14.

[17] Hal K. Rothman, *The greening of a nation? Environmentalism in the United States since 1945* (Fort Worth, TX, 1998), pp. 101–5; Adam Rome, *The genius of Earth Day: how a 1970 teach-in unexpectedly made the first green generation* (New York, NY, 2014), pp. 33, 42, 67; John McCormick, *Reclaiming paradise*, pp. 57–9, 114–16; Samuel P. Hays, *Beauty, health and permanence: environmental politics in the United States, 1955–1985* (Cambridge, MA, 1993), pp. 448–53; Robertson, *The Malthusian moment*, pp. 164–8.

[18] Kurkpatrick Dorsey, *Whales and nations: environmental diplomacy on the high seas* (Seattle, WA, and London, 2013), pp. 207–42; Hays, *Beauty, health and permanence*, pp. 113–15; Joachim Radkau, *Nature and power: a global history of the environment* (New York, NY, 2008), p. 294; Roderick Nash, *The rights of nature: a history of environmental ethics* (Madison, WI, 1989), pp. 172–82.

[19] Carmel Finley, *All the fish in the sea: maximum sustained yield and the failure of fisheries management* (Chicago, IL, 2011), and *All the boats on the ocean: how government subsidies led to global overfishing* (Chicago, IL, 2017); Brian J. Payne, *Fishing a borderless sea: environmental territorialism in the North Atlantic, 1818–1910* (East Lansing, MI, 2010); Jeffrey Bolster, *The mortal sea: fishing the Atlantic in the age of sail* (Cambridge, MA, 2012). A classic here is Arthur McEvoy, *The fisherman's problem: ecology and law in the California fisheries, 1850–1980* (Cambridge, 1986).

[20] Paul R. Ehrlich, 'The food from the sea myth: the natural history of a red herring', speech presented to the Commonwealth Club of California on Friday, 21 Apr. 1967. Paul Ehrlich papers, box 7, folder 2, Special Collections and University Archives, Stanford University. Thanks to archivist Tim Noakes for allowing me to access this document.

[21] Paul Ehrlich, *The population bomb* (New York, NY, 1968). On the history of neo-Malthusianism in post-First World USA, see Robertson, *The Malthusian moment*.

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world demographic trajectory and the planet's capacities to face it was initially optimistic but later became pessimistic.[22] The terrible famine of 1966–7 in the Indian province of Bihar contributed greatly to this bleak analysis. In his presentation in the spring of 1967, he predicted a Malthusian catastrophe, with the crossing of the curves of population and of planetary resources. He warned: if we do not act now, our requirements – and especially all our food requirements – can no longer be met. The environment and the ecosystems will be destroyed by overpopulation.

We must dispel the 'food from the sea myth', hammered Ehrlich during his presentation. He later wrote that this was the most pervasive myth of the population–food crisis,[23] referring to a cornucopian vision combining technological optimism and faith in the extraordinary fertility of the seas, that saw in the oceans a quasi-unlimited source of food for future generations. On the one hand, Ehrlich argued that the catches that could be extracted from the seas of the globe were limited; on the other hand, that humans were already overexploiting fishery resources, at the risk of destroying them. Using the species most likely to awaken compassion, he pointed out that whaling was only the most visible aspect of this contemporary movement of overexploitation of the seas. His conclusion was that 'the idea of the sea as an inexhaustible source of food is a pipe dream'.[24]

Ehrlich fought here against a widespread and tenacious idea. It was difficult, of course, to ignore the many fish stock collapses. But even when these collapses were blamed on human action, two ideas surfaced again and again: on the one hand that they are *local*, and on the other that they are *reversible*. It was believed that suspending fishing activities would be sufficient to rebuild stocks. The solution would be to find new areas for the exploitation of fishing resources, or focus on less-valued species.

Ehrlich's talk at the Commonwealth Club was broadcast on radio, thanks to which he received many speaking invitations as well as a proposal from David Brower to write a small book for his organization the Sierra Club.[25] This became *The population bomb*. In his many subsequent books and articles, Ehrlich continued his fight against the 'food from the sea myth'. For him, as for the entire neo-Malthusian camp, it was crucial to discredit the vision of the ocean as a horn of plenty in the eyes of the general public, in order to spread the perception of a *closed* world with *finite* resources; finite resources, moreover, whose very existence was threatened and which were thus less and less capable of supporting an expanding population.

[22] Robertson, *The Malthusian moment*, pp. 135–6.

[23] Paul R. Erhlich and Anne H. Ehrlich, 'The food-from-the-sea myth', *Saturday Review*, 4 Apr. 1970, pp. 53–5, 64–5.

[24] Ibid., p. 6.

[25] Heather Newbold, ed., *Life stories: world-renowned scientists reflect on their lives and on the future of life on Earth* (Berkeley and Los Angeles, CA, 2000), p. 19.

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III

The cornucopian vision that the neo-Malthusians were combating was the result of two decades of euphoria in the world of industrial fishing. In the immediate post-war period, fleets were greatly damaged. But the reconstruction efforts orchestrated by the states, in the USA, in Europe, and in Japan, resulted in more powerful and better-equipped fleets. Converted military equipment (ships, communication, and detection systems) provided cheap technical resources and was easily adaptable to new uses. In the 1950s, three technological innovations dramatically increased catching power: sonar detection systems; synthetic fibre nets; and power block devices for purse seine fishing.

American and European fleets intensified their exploitation of the entire Atlantic continental shelves. But they also started exploring further into new areas, to catch new species.[26] The race for the tropical tuna is emblematic of this development: American fishers captured it in the Pacific Ocean,[27] while Spanish and French fishers caught it along the coasts of Morocco, Mauritania, and Senegal. In the mid-1950s, other countries burst onto the international waters and joined the bandwagon of aggressive fishing. The USSR invested heavily in the exploitation of deep-sea fishing, while Peru via its anchovy fisheries established itself as one of the world's major fishing nations. Over two decades, from 1950 to 1970, global catches of fish, crustaceans, and mollusks more than tripled, according to the estimates of the Food and Agriculture Organization (FAO). It increased from 16.7 to 58.1 million tons.[28]

This full-scale expansion of industrialized fishing was relayed in myriad ways, from newspapers to specialist journals, described from a utopian, productivist, and technicist point of view. Moreover, these articles stated repeatedly that new tools would very soon turn the sea into a new Eldorado, with electric fields that attracted or trapped fish shoals, 'vacuum cleaners' that literally vacuumed whole schools of fish out of the sea, remote-controlled or automatic pelagic trawls, and upwelling zones – and thus massive concentrations of fish – created on command by underwater nuclear power plants.[29] This also included *sea farming*, that is to say fish farming and the cultivation of marine plants in the open sea, which were described, compared to fishing, as a change in civilization akin to the Neolithic transition.

To this must be added the more immediate hopes raised by deep-sea fish, such as lanternfish, which some experts believed would allow the world's

[26] Wilf Swartz et al., 'The spatial expansion and ecological footprint of fisheries (1950 to present)', *PloS ONE*, 5 (2010), pp. 1–6.

[27] Finley, *All the fish in the sea*.

[28] www.fao.org/fishery/statistics/ (accessed 14 Mar. 2017).

[29] Dayton L. Alverson and Norman J. Wilimovsky, 'Prospective developments in the harvesting of marine fishes', in *Modern fishing gear of the world* 2 (London, 1964), pp. 583–9.

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catch to be more than doubled.[30] This frenzy of promises was not – or not only – the act of journalists looking for headlines. It could also be found in statements by biologists, fishermen, oceanographers, and international officials such as Donovan B. Finn, director of the FAO Fisheries Section as well.[31]

A new type of food resource was added to this promise of intensified mainstream fishing. First, there was fish protein concentrate (FPC), a synthetic food produced from low-value species and fish remains. The idea was to produce a colourless, odourless food without flavour but rich in protein, which could be processed at will.[32] In the early 1960s, the American company VioBin carried out production tests, but met with some reticence from the US regulator, the Food and Drug Administration. Finally, FPC was authorized and became the spearhead of the 'Food from the sea for undernourished people of the world' programme led by USAID from 1967 to 1969. Chile, Morocco, and Korea served as test countries for the production and the distribution of FPC. The initiative was originally promoted by the US Bureau of Commercial Fisheries to promote the use of fishery by-products. But the USAID project was a failure, both because the quality of the FPC product was unsatisfactory, and because of disagreements between USAID and the country authorities. This did not prevent fish protein concentrate from arousing the interest of experts, public authorities, and the press over the long term.[33]

The second 'sea-food of the future' was identified at the bottom of the marine food chains in the form of plankton. The idea of plankton fisheries is ancient and was being debated again in the post-war decades. But it became especially attractive in the late 1960s, when krill – tiny shrimps living in the Antarctic region – began to create high expectations. The idea was either to extract an FPC-type food or to use it – as was already the case for some fishery by-products – as high-protein powder for feeding livestock. The project stage was left behind when in 1972 Soviet and then Japanese fisheries began fishing the Antarctic krill. More than 500,000 tons were fished during the year 1982, the highest level of production, before the collapse of the USSR put an end to it. In the 1970s, krill was constantly alluded to in order to imagine new 'unconventional' ways of extracting food from the oceans.[34] According to

[30] Lucian M. Sprague and John H. Arnold, 'Trends in use and prospects for the future harvest of world fisheries resources', *Journal of the American Oil Chemists' Society*, 49 (1972), pp. 345A–350A.

[31] Donovan B. Finn, 'L'essor mondial de la pêche', *Le Courrier de l'UNESCO* (July–Aug. 1960), pp. 56–8.

[32] Ernst R. Pariser et al., *Fish protein concentrate: panacea for protein malnutrition?* (Cambridge, MA, 1978).

[33] Among the most enthusiastic authors, see Clarence P. Idyll, *The sea against hunger* (New York, NY, 1970), pp. 128–44.

[34] See for example David Sturgeon, 'The nutrition crunch: a world view', *Bulletin of Atomic Scientists* (Oct. 1973), p. 53.

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some projections, 50 to 75 million tons of this zooplankton could be taken from the seas in the decades to come.[35]

These radiant visions reflect the optimism of the years of reconstruction and modernization in the fisheries sector. But if these attitudes were so widespread and hyperbolic, it was also because they were part of a great movement that promoted the exploration and colonization of the oceans as a new horizon for the United States and the whole of humanity.

Knowledge and control of the seas was a major issue in the global Cold War. As early as the 1940s, military funding flowed into the Scripps and the Woods Hole institutions, the two main American centres of marine science. But it was the International Geophysical Year of 1957–8 that marked a turning point in the committment of the US federal government to civil oceanography and marine engineering.[36] In the 1960s, the advances in saturation diving suggested the possibility of a permanent colonization of the seabed by humans. The US Navy explored this possibility with its Sea Lab programme (1964–9), as did Jacques-Yves Cousteau at the same time with his Conshelf modules immersed in the Mediterranean (1962–5).[37] For the general public and a significant segment of the scientific and technical world, these first attempts foreshadowed the underwater cities and factories of the future.[38] They also responded, more prosaically, to the expectations of oil companies wishing to explore new methods for extracting resources from the seabed. These perspectives of undersea life also inspired visions for fisheries of the future: the British biologist Alister Hardy imagined one with a unique mother ship co-ordinating the action of a myriad of submarine tractors, controlled by humans and operating in a line to make catches at the bottom of the seas.[39]

In addition to funding for research on underwater habitats, the American federal government invested heavily in research and pilot projects for the exploitation of marine resources. A first organization, the Interagency Committee on Oceanography, was created in 1960 to co-ordinate these efforts. Then in June 1966, Congress adopted a Marine Resources and Engineering Development Act, which strengthened this co-ordination and defined a national policy framework. A sea grants programme was launched on the model of the Land Grant colleges programme of agricultural education, but applied to marine resources. At the end of the decade, the work of a committee of experts, the Stratton Commission, resulted in the report *Our nation*

[35] Sprague and Arnold, 'Trends in use and prospects'.

[36] Hamblin, *Oceanographers and the Cold War*.

[37] On the Sea Lab programme, see Ben Hellwarth, *Sealab: America's forgotten quest to live and work on the ocean floor* (New York, NY, 2012).

[38] Helen M. Rozwadowski, 'Engineering, imagination, and industry: Scripps Island and dreams for ocean science in the 1960s', in Helen M. Rozwadowski and David K. van Keuren, eds., *The machine in Neptune's garden: historical perspectives on technology and the marine environment* (Sagamore Beach, MA, 2004), pp. 315–53.

[39] Alister Hardy, *The open sea: its natural history* (Boston, MA, 1956), p. 303.

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and the sea (1969), which made recommendations to intensify the efforts already under way. This process led to the creation in 1970 of the National Oceanic and Atmospheric Administration (nicknamed the 'wet' NASA), responsible for all civilian marine activities, including fisheries.

This massive investment had a strong strategic dimension: the ocean was a battlefield of the Cold War, both as a terrain for military confrontation and resource exploitation. But these projects were also underpinned by an 'economy of promises' that was expressed, more prosaically, in financial terms. The ocean was perceived as a huge source of profits, because of its energy and mineral resources: first with the exploitation, already under way, of oil and gas deposits of the continental shelves; and then with projects of industrialists and states to exploit the polymetallic nodules, these being rock formations rich in manganese, copper, and cobalt, to be found at the bottom of the seas. The first mining tests were carried out in 1970, off the Florida coast, on behalf of Deep Sea Ventures, a subsidiary of the American automotive supplier Tenneco.

IV

In the Cold War decades, economic growth and faith in science manifested in a belief that the ocean promised everything and anything.[40] Like space, the sea was presented as a new frontier to be explored and mastered by technosciences. This mythology of the frontier corresponded to the idea of the ocean as a new wilderness, to be conquered so as to provide the foundations of a society of the future.

In 1953, Fairfield Osborn, president and co-founder of the Conservation Foundation, one of the most prominent institutions in matters of conservation and the protection of nature, published his new book, *The limits of the earth*.[41] Osborn was one of the artisans of the revival of Malthusianism in the US, with his bestseller, *Our plundered planet*,[42] published just after the Second World War. This book, like William Vogt's *Road to survival*, published the same year,[43] signalled the start of three decades of debates, expertise, and controversies regarding overpopulation, the integrity of ecosystems, and the conditions of existence of societies. But neither of the books raised the issues of marine resources and fisheries.[44] And this, despite Vogt's stances, had much to do with his professional experience in Peru, in the management of guano which depended on the population of seabirds and therefore on the availability of fish.[45]

[40] New antibiotics; minerals extracted from the sea; fresh water produced through desalinization.

[41] Fairfield Osborn, *The limits of the earth* (Boston, MA, 1953).

[42] Fairfield Osborn, *Our plundered planet* (London, 1948).

[43] William Vogt, *Road to survival* (New York, NY, 1948).

[44] Nothing either in the third classic Guy Irving Burch and Elmer Pendell, *Population roads to peace or war* (Washington, DC, 1945).

[45] Cushman, *Guano and the opening of the Pacific world*, pp. 189–204.

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Yet interestingly, their books attracted the interest of a young biologist at the US Bureau of Fisheries: Rachel Carson. She was not yet the great figure of environmentalism who would denounce the DDT-related *Silent spring*.[46] She was working on the manuscript of her first editorial success, *The sea around us*. In this book published in 1951, she described the physical and biological marine environment in scientific and poetic terms. Sceptical of long-tem effects of human action on marine environments, she wrote that 'Man cannot control or change the ocean as, in his brief tenancy of earth, he has subdued and plundered the continents.'[47] It was the effects of nuclear tests in the Pacific Ocean which would dampen this optimism a decade later.[48] They made her see that certain effects of human action, in this case radioactive pollution, would be a massive threat to marine environments, from the end of the 1950s onwards.[49]

It does not mean, however, that in 1951, Carson shared the cornucopian vision of the ocean as an unlimited source of food. In the draft of an unpublished chapter of her book (entitled 'The ocean and a hungry world'), filed in her archives at the Yale Beinecke library, she reacted to Vogt's and Osborne's bestsellers, asking 'are the sea's food reserves large enough to make up for the manifest deficiencies of the land? Can now and hithertho untaped food resources be discovered in the sea … and what of plankton'?[50] She offered a balanced opinion, finding it 'very difficult' to know 'where the truth lies', because of the massive uncertainty regarding the dynamics of the ocean, the variability of marine life, the possibility of exploiting plankton fisheries. She thought it possible to intensify fishing efforts, but also stressed the high variability of marine food production.

Despite these early (unpublished) reflections on the topic, the issue of marine resources and fisheries long had remained marginal in the debates on population, food production, and security. But things evolved at the beginning of the 1950s, and in 1953, Osborn devoted almost a whole chapter to the question of fisheries and food extracted from the seas in *The limits of the earth*. This chapter, named 'Horizons and mirages', was a counter attack: much has been said lately, wrote Osborn, about the 'vast storehouses of unexploited wealth' of the oceans.[51] In fact, he continued, this is largely an invention of 'science-fiction reporters', of the 'headline-hungry press'. In response, his analysis was presented as dispassionate: according to him, it is possible to fish more

[46] Rachel Carson, *Silent spring* (Boston, MA, 1962).

[47] Rachel Carson, *The sea around us* (New York, NY, 1951), p. 18.

[48] Lutts, 'Chemical fallout', pp. 210–25.

[49] This question is raised in the 1961 edition of *The sea around us*. See also Rachel Carson, 'The pollution of our environment' (1963), in Linda Lear, ed., *Lost woods: the discovered writing of Rachel Carson* (Boston, MA, 1998), section 30.

[50] 'The ocean and a hungry world', unpublished draft, box 7, Rachel Carson papers, Beinecke Library, Yale University.

[51] Osborn, *The limits of the earth*, p. 173.

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(perhaps 25 per cent more), and maybe to use plankton and marine plants, if one finds how to transform them into acceptable nutrients. The same year, 1953, Samuel Ordway, a close collaborator of Fairfield Osborn as vice-president of the Conservation Foundation, described the perspectives opened up by a full exploitation of the seas as one the main arguments of the 'Cornucopians' denying the imminence of physical limits to world population growth.[52]

Several years later, Osborn, acting as president of the Conservation Foundation, commissioned a report on the living resources of the sea from Lionel A. Walford, the US Fish and Wildlife Service's chief biologist. Much more cautious than many of his peers, Walford concluded that it was possible to expect new food resources from the oceans, but that above all uncertainty prevailed in this matter.[53] In 1953, Osborn and Ordway responded to a series of public statements, which had identified in marine resources a solution – at least partly – to solving the problems of overpopulation, or which had mentioned them for dismissing the very idea of a Malthusian threat. This argument appeared, first, in one of the most influential anti-Malthusian texts of the twentieth century, *The geopolitics of hunger*, by Brazilian doctor Josué de Castro, published in Portuguese, French, and English in 1951–2.[54] Castro confidently argued that intensification of ocean fisheries and development of sea farming would permit the future evolution of world population.[55]

Osborn's interventions also responded to the context of public debates surrounding the creation and activities of the US president's Materials Policy Commission (also known as the Paley Commission). The commission was convened by Truman in January 1951, and made public its conclusions in a report issued in June 1952.[56] This report affirmed the prospect of future shortages but ultimately rejected Malthusian concerns about limits, as expressed by Vogt and Osborn. A chapter on the 'technology of ocean resources' by the oceanographer Iver Igelsrud described the possibilities of full exploitation of the oceans, in terms of metal and mineral extraction, production of fresh water, food production (harvesting and cultivation of algae), fertilization of coastal waters for fish transplantation and farming, and the use of fish oils.[57]

Osborn's chapter in *The limits of the earth* was a response to such claims, and also to Francis Minot, director of the Marine and Fisheries Engineering Research Institute of the Woods Hole Institution, who had written two pieces along the same cornucopian line of thought in the *New York Times* in January

[52] Samuel H. Ordway, *Resources and the American dream: including a theory of the limit of growth* (New York, NY, 1953), pp. 19, 25.

[53] Lionel A. Walford, *Living resources of the sea: opportunities for research and expansion: a Conservation Foundation study* (New York, NY, 1958).

[54] We have consulted the French edition: Josué de Castro, *Géopolitique de la faim* (Paris, 1952).

[55] Ibid., pp. 312–14.

[56] *Resources for freedom* (5 vols., Washington, DC, 1952).

[57] Ibid., IV, pp. 115–26.

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1952 and 1953.[58] Calories and proteins deriving from the ocean's flora and fauna, explained Minot, were a solution to agricultural land shortages caused by world population growth. According to him, fish catches could be quadrupled; electric fishing gear improved further; and research conducted on developing ever more sophisticated methods and technologies for exploiting a new world of resources. He concluded by calling for increased funding in all these domains – which were also those of his own research institute.

Minot set out this point of view in a book, written shortly after with a former editorial executive of the American Museum of Natural History. Its title was in itself a manifesto, *The inexhaustible sea*.[59] The prowess of the fisheries of the future would allow a 'whole new world of potential abundance and productivity'. The sheer size of the oceans, together with their fluidity, were the secrets of their biological 'inexhaustibility', which would be assured if minimal conservation principles were applied.[60] In addition to this biological fertility, there were huge quantities of minerals and chemical compounds that could be extracted.[61] The Malthusian catastrophe was neither imminent nor inevitable: it could be avoided through a rational and intensive exploitation of marine areas. *The inexhaustible sea*, an archetypal example of ocean cornucopia, was an editorial success and was reissued five times in the 1950s and 1960s.

V

For neo-Malthusians, it was essential to fight these positions, which presented the conquest of the oceans as a solution to overpopulation, or at least to the problem of the protein gap, the chronic deficit in proteins of Third World countries. They shared this concern with the critics of growth. Thus, the Club of Rome's report *Limits to growth* (1972) took care to describe the state of fisheries as the end of the era of expansion triggered by the Second World War.[62] The challenge was twofold: to gain public support, but also to persuade and convince political and administrative circles, in Washington and elsewhere. It is this necessity that made American neo-Malthusians of the 1960s and 1970s key players in the production and the dissemination of discourses stressing the limited and fragile nature of fish stocks, and the very real and severe threat of their depletion. Their diagnosis was based on three main arguments, converging to the same conclusion, that of a global fisheries crisis. They used a range of scientific works by fisheries biologists to formulate and disseminate

[58] Francis Minot, 'To increase food supply: improvement of world fisheries is believed a necessary step', *New York Times*, 9 Jan. 1952; 'World fish production: development of marine resources to augment food supply urged', *New York Times*, 18 Jan. 1953.

[59] Hawthorne Daniel and Francis Minot, *The inexhaustible sea* (London, 1954).

[60] Ibid., p. 19.

[61] Ibid., p. 92.

[62] Donella H. Meadows et al., *The limits to growth: a report for the Club of Rome's project on the predicament of mankind* (New York, NY, 1972), p. 151.

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this conclusion, that they then integrated into a bleak picture of the present and the future of world fisheries.

The first argument followed from the analysis of a series of cases of overexploitation or collapse of stocks. The conclusion: the same process was at play, for a few decades, all around the globe. Henceforth, it was out of the question to avoid the problem by colonizing new water expanses. The case of North Atlantic stocks, the most heavily monitored on the planet, was the very heart of the matter, as the world measured declining stocks of Eurasian continental shelf hake, North Sea herring, British Isles' haddock, and Northwest Atlantic cod.[63] Regarding the last case, the late 1960s coincided with one of the major ecological disasters of the twentieth century, namely the collapse of the Grand Banks cod fishery that had made fishermen in Europe and North America prosperous since the sixteenth century. After record catches in 1968, yields declined in the 1970s. The 1977 proclamation of an exclusive economic zone by the Canadian government did not reverse the process. Huge populations of demersal fish in Newfoundland would never replace themselves, and neo-Malthusian writings analysed the various dimensions of this ecological disaster.[64] Another illustrative case was that of Peru's huge anchovy stocks, which in a few years had made the country one of the foremost fishing nations in the world. In their reports, neo-Malthusians highlighted the great variability of its catches, to suggest that fisheries provided food at levels which fluctuated too much to be a reliable resource as a main source of food.[65]

The second argument dealt differently with the issue of catch limits. Since the Second World War, fisheries specialists had been trying to produce estimates of the world production potential of fisheries. These estimates, which were cautious in the 1950s (they predicted a doubling), increased dramatically in the 1960s and 1970s when deep-sea fish and krill were included in the projections.[66] Two major methods were used to produce these estimates. Some were based on extrapolations of current trends of catch in different regions of the globe. Others were based on a quantification of primary ocean photosynthesis, and on energy transfers in the aquatic food chains. These calculations, produced by the experts affiliated with FAO, oceanographic institutions, and national fisheries offices, were the subject of intense controversies among researchers. One of their weak points was the difficulty in assessing the proportion of catches that would be profitable to transport, process, and market. The

[63] William and Paul Paddock, *Hungry nations* (Boston, MA, 1964), pp. 313–14; Paul R. Ehrlich, Anne H. Ehrlich, and John P. Holdren, *Global ecology: problems and solutions* (San Francisco, CA, 1973), pp. 102–4; Lester Brown, *The twenty-ninth day: accommodating human needs and numbers to the Earth's resources* (New York, NY, 1978), pp. 19–20.

[64] Lester Brown et al., *Twenty-two dimensions of the population problem* (Washington, DC, 1976), pp. 13–14.

[65] Ibid., p. 13; and Paddock and Paddock, *Hungry nations*, pp. 313–14.

[66] Daniel Pauly, 'One hundred million tonnes of fish, and fisheries research', *Fisheries Research*, 25 (1996), pp. 25–38.

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social acceptability of foods made from krill or exotic fish was also under question.

Neo-Malthusians preferred the calculations of American biologist John Ryther. His *Science* article of October 1969 was quoted as evidence that global marine resources were limited and that humankind was nearing maximum catch volumes.[67] His calculations, based on the method of primary photosynthesis, led him to a theoretical limit of 100 million tons which could not be exceeded.[68] At the then current rate of fishing, Ryther said, world fisheries would reach an insurmountable limit by the late 1970s. This estimate was two to three times lower than that given by the FAO's Fisheries Department,[69] and far less than the 400 to 700 million tons put forward by other authors.[70] This is explained notably by the fact that the latter included at the same time both higher estimates of 'conventional' fish species, and krill.

The final argument supporting the diagnosis of a fisheries crisis was based on global catch statistics. This quantification tool was the product of the long and patient efforts of the FAO and its Fisheries Department. Since its creation, the department had been collecting, standardizing, and compiling each country's catch for study and forecasting purposes. The final product of this vast technical-administrative machinery was to create an aggregate indicator, unique in its type for primary production, which provided the total mass of fish caught every year in the seas of the world.[71] This data set, by its scope, is still a source of essential information for researchers, administrations, and activists interested in fisheries.

Yet as noted, according to this indicator, world catches more than tripled between 1950 and 1970. So why refer to it? First, because in the late 1960s, catches were steady for the first time since the Second World War. They even declined in 1969, which Ehrlich suggested in *The population bomb* to be a sign that a global fishing limit was approaching. This decline did not last long, but growth would no longer reach the 4 to 5 per cent annual increases of the 1950s and 1960s. In the 1970s, this allowed Lester Brown to point out that the trend had reversed: population growth outweighed that of catches, pushing fish catches per capita lower every year.[72] The limits of the earth had

[67] Erhlich and Ehrlich, 'The food-from-the-sea myth', p. 53; Ehrlich, Ehrlich, and Holdren, *Global ecology*, p. 97. Ehrlich also re-edited Ryther's article, John P. Holdren and Paul Ehrlich: *Global ecology. readings toward a rational strategy for man* (New York, NY, 1971), pp. 30–8.

[68] John H. Ryther, 'Photosynthesis and fish production in the sea', *Science*, 166 (1969), pp. 72–6.

[69] John A. Gulland, 'Summary', in John A. Gulland, ed., *The fish resources of the ocean* (West Byfleet, 1970), pp. 246–55.

[70] Sprague and Arnold, 'Trends in use and prospects'; Idyll, *The sea against hunger*.

[71] The first volume was published in 1948: *Yearbook of fisheries statistics, 1947. Production and fishing craft* (Washington, DC, 1948).

[72] Lester Brown, *The interdependence of nations* (New York, NY, 1972), p. 28; Brown et al., *Twenty-two dimensions of the population problem*, pp. 11–12; Brown, *The twenty-ninth day*, pp. 17–18.

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been reached, he concluded, as was the case of water and mineral resources, and of availability of arable land.

These diagnoses of global fisheries crisis were also based on a political analysis. The neo-Malthusian authors shared one conclusion: the situation was anarchic and dangerous. Anarchic, because countries were racing apace for declining marine resources to meet the demands of their growing populations. And dangerous because this competition created geopolitical tensions that threatened peace. These tensions were, in fact, recurrent in the 1950s, 1960s, and 1970s, between fishing nations and countries with stocks off their coasts. There were notably severe tensions between the USA, Peru, and Ecuador over tuna fisheries and recurring 'cod wars' between Great Britain and Iceland.[73] The presence of Soviet factory processing ships off the American coast also fuelled tensions, especially since they were suspected (not without reason) to serve as listening stations. There were also the north/south imbalances and the capture of tropical stocks by Western ships, which were denounced by authors like Lester Brown and Georg Borgström. The latter, the most Third-Worldist in his analysis, even created a new category of analysis: 'fish acreage'.[74] This represented the 'ghost hectares' that would have been necessary for a country to raise cows providing milk proteins equal to those obtained by its sea fishing.[75] Its value gave an idea of the appropriation of high-seas resources by certain industrialized nations, which was all the more shocking when one found out that the proteins extracted from the oceans were destined to feed not humans but livestock.[76]

VI

Neo-Malthusian circles were not only essential in spreading the diagnosis of a global fisheries crisis, they were also key to structuring and disseminating an *analysis* of stock depletion processes. This analysis revolved around a very specific line of reasoning: the 'tragedy of the commons'. On 22 April 1970, the biologist Garrett Hardin was at the campus of the University of Illinois, Chicago. He was giving a teach-in for Earth Day, one of the high points of the era's environmentalism.[77] His theme was the 'tragedy of the commons', which he had described shortly before in an article in *Science*.[78] Hardin's argument, one of the most famous of the environmentalist canon, was based on a thought experiment. Farmers share a common pasture for their livestock. It is always in their interest

[73] Finley, *All the fish in the sea*, pp. 118, 123–8.

[74] Borgström is Swedish but taught at the University of Michigan. For his career path, see Linnér, *The return of Malthus*.

[75] Georg Borgström, *The hungry planet: the modern world at the edge of famine* (New York, NY, 1970), pp. 31–5.

[76] Georg Borgström, *The food and people dilemna* (North Scituate, MA, 1973), pp. 34–6.

[77] National Staff of Environmental Action, ed., *Earth Day: the beginning* (New York, NY, 1970).

[78] Garrett Hardin, 'The tragedy of the commons', *Science*, 162 (1968), pp. 1243–8.

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to add an extra cow, because they will make a profit after fattening and selling the animal. However, each addition has a negative impact: the grass is shared among more cows, and hence each of them is fattened less. But because this effect is distributed among all the animals and the profit of an additional animal is individual, it is always beneficial to add a cow. Grazed by always more animals, the pasture is overexploited and then destroyed. Hardin's conclusion: common property (here considered the same as open access) is incompatible with a sustainable exploitation of resources. The only solutions, he argued, are either private appropriation of the land or its centralized management (for example by the state).[79] As I have shown in detail elsewhere, Hardin's biographical trajectory and the reasoning of the 'tragedy' itself were that of a neo-Malthusian militant.[80] The underlying message of the *Science* article was that the world's resources (grazing grounds) were being destroyed by the constant addition of more children (the cows), whose negative impact affected all. According to Hardin, the way out of this situation was to control reproduction itself, either via market incentives or through state intervention.

But the argument, and this was its strength, was applicable to many situations. And for his Earth Day speech, Hardin applied it to a specific issue: that of overfishing. His explanation was simple: because fish stocks were *commons*, exploited by fishermen always wanting to catch more, they were bound to be overexploited and then destroyed. Hardin had already mentioned in his *Science* article that overfishing was a particular case of a 'tragedy of the commons'.[81] Later, he proposed that an international management agency with coercive powers be created in order to protect high-sea fisheries from depletion.[82] This interpretation using the 'tragedy of the commons' framework quickly became dominant in the analyses dealing with fisheries. A reason for this is that, beyond the specific attraction which it exercised, it popularized an older economic analysis, while generalizing it (and this although Hardin formulated his argument independently).[83] As in their diagnosis of a global fisheries crisis, here the neo-Malthusians played the role of formulating and spreading general arguments on overfishing, by translating technical results (of political economy), in striking conclusions widely understandable and reusable.

It was H. Scott Gordon, a Canadian economist, who in 1954 had proposed a microeconomic model of a fishing zone to demonstrate that the very structure of the resource – open access qualified as 'common property' – made it

[79] Among the solutions excluded *de facto*: community governance – a conclusion that was challenged, in the 1970s, by anthropologists, historians, and political scientists at the origin of the contemporary 'commons paradigm'. Fabien Locher, 'Third World pastures: the historical roots of the commons paradigm (1965–1990)', *Quaderni Storici*, 1 (2016), pp. 303–33.

[80] Locher, 'Cold War pastures', pp. 7–36.

[81] Hardin, 'The tragedy of the commons', p. 1245.

[82] Garrett Hardin, *Exploring new ethics for survival: the voyage of the spaceship Beagle* (New York, NY, 1972), pp. 120–2.

[83] Locher, 'Cold War pastures', p. 29.

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inevitable that all economic rent would finally be dissipated, because each player was engaged in a race to exploit the stocks before the others.[84] Although his argument was primarily concerned with economic efficiency, Gordon pointed out that this process also led to a tendency for physical depletion. His solution, as for Hardin, was either to impose exclusive ownership of the resource or to centralize the regulation of its use. It was in the framework of a contract for the Department of Marine and Fisheries of the Canadian Government that Gordon took an interest in these issues.[85] His survey, conducted in the summer of 1951, examined the potential development of the Prince Edward Island fisheries on the Atlantic coast.[86] The research was part of the efforts of the Canadian state to develop this poverty-stricken coastal region. Gordon concluded that massive over-investment in men, boats, and capital had led to a low standard of living for fishermen. It is this empirical observation that Gordon generalized in 1954 by theorizing the link between 'common property' and dissipation of rent. This work was bolstered by the appointment of Frederick E. Popper, former director of the Department of Marine and Fisheries, as chief of the Economics Branch of the FAO Fisheries Department.[87] Gordon participated in a round table, which in September 1956 brought together in Rome the few economists working on fisheries, with the support of the UN agency. The resulting volume of work was relayed by the international institution and circulated in universities and administrations all over the world.[88]

After Gordon, a generation of North American economists (Francis T. Christy, Anthony Scott, James Crutchfield) repeated his argument linking common property, rent dissipation, and depletion, the backbone of the new emerging field of the economics of fisheries. This field revolved around researchers working in universities on the west coast of North America (Vancouver and Seattle) and benefited from funding from the think-tank Resources for the Future, close to the US federal administration. Indeed, Gordon's analysis dominated this field of expertise, but remained confined to it until the late 1960s. Only then, reformulated and generalized by the economist Vernon Smith[89] and popularized by Hardin, did it become one of the standard arguments for the whole economy of resources.

[84] H. Scott Gordon, 'The economic theory of a common-property resource: the fishery', *Journal of Political Economy*, 62 (1954), pp. 124–42.

[85] Thomas K. Rymes, ed., *Welfare, property rights and economic policy: essays and tributes in Honour of H. Scott Gordon* (Ottawa, ON, 1991).

[86] H. Scott Gordon, *The fishing industry of Prince Edward Island* (Ottawa, ON, 1952).

[87] Anthony Scott, 'The pedigree of fishery economics', *Marine Resource Economics*, 26 (2011), pp. 75–85.

[88] Ralph Turvey and Jack Wiseman, eds., *The economics of fisheries* (Rome, 1957).

[89] Vernon L. Smith, 'Economics of production from natural resources', *American Economic Review*, 58 (1968), pp. 409–31.

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It is also the reference to the 'tragedy' that inspired one of the most influential concepts in the present-day discussions on marine ecosystems, the impact of fisheries and the planetary ecological issues as a whole: that of *global commons*. The term 'world commons' appeared for the first time in 1970, in a book written by Paul Ehrlich.[90] It designated grand ecological entities that were vital to the whole of humanity, but were outside the control of states, such as the high seas, the atmosphere, hydrological and biogeochemical cycles. It was William Ross, a Ph.D. student of the University of Washington in Seattle, who invented the variant 'global commons' the following year, to speak more specifically about the oceans, which were threatened by overfishing, pollution, and the race for mineral resources.[91] These terms were derived directly from the argument of the tragedy of the commons. The idea is that these entities were open to the exploitation of states and private firms, in the manner of Hardin's pastures. That is to say with no restriction – because there was no state or international control, and with negative impacts shared among all. And it was human population expanding in the north as in the south, stressed the neo-Malthusians, that was behind this race to exploit the sea resources.

In the 1970s and 1980s, 'world commons' and 'global commons' were commonly used in the English-speaking world to designate the major components of the biosphere which, being treated as commons (considered here, again, the same as open access), saw their very existence threatened.[92] During these decades, there were heated debates on the necessity for and forms of global government needed for the preservation of Earth resources and ecosystems. These reflections on world governance were helped along by the development of an environmental diplomacy, in a context of *détente* between the two blocs. The oceans were a major issue in this context, with the need to regulate in international waters: high-sea fisheries; pollution (including radioactive pollution); the future exploitation of the seabed for oil, gas, and nodules.

The idea of a world government of the oceans was intensely discussed in political science, in the first books that appeared on international relations applied to the environment in the early 1970s.[93] But above all, this ambition was present in the processes underway in UN forums. It took shape around the concept of the seabed as 'Common Heritage of Mankind' outside national jurisdiction. Arvid Pardo, then Malta's ambassador to the UN, played a decisive role in 1967 by pushing for the creation of a special commission in charge of studying the legal status of the ocean floor and subsoil of the high seas. In 1970, with the

[90] Paul R. Ehrlich and Anne H. Ehrlich, *Population, resources, environment* (San Francisco, CA, 1970), p. 315.

[91] William M. Ross, 'The management of international common property resources', *Geographical Review*, 61 (1971), p. 337.

[92] There are also other rarer variants such as 'earthly commons'. Brown, *The twenty-ninth day*, p. 17.

[93] See notably Lynton K. Caldwell, *In defense of Earth: international protection of the biosphere* (Bloomington, IN, and London, 1972), pp. 134–40, 180–4.

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support of the UN Assembly but also of the Nixon presidency, this project of a new legal regime became central to the Third United Nations Conference on the Law of the Sea (UNCLOS III).[94] This political and diplomatic process gave rise to immense hope in multilateralist and environmentalist circles. A world government of the high seas (or at least of its soil and subsoil) seemed, after all, an achievable objective. In the background, there emerged the hope that such a regime could pave the way for a world government of the entire biosphere.

In 1969, Elizabeth Mann-Borgese, one of the executives of the Center for the Study of Democratic Institutions, a Santa Barbara think-tank, described an 'ocean regime': a planetary institution with broad powers for regulating, monitoring, and policing open-sea activities.[95] Her idea was to declare the waters of the high seas, as well as their seabed and subsoil, a common heritage of mankind. That is to say not only inanimate natural resources targeted by the Pardo initiative (such as nodules, gas, and oil), but also fishing stocks. The goal of this 'regime' was to provide a framework for regulating competition between countries and thus contribute to establishing peace; to protect the oceans from activities which were harmful to their ecosystems; and to supervise mechanisms for the redistribution of wealth to less-developed countries. The solution was backed by Ehrlich in the early 1970s: for him, the 'ocean regime' designed by Mann-Borgese was an essential first step to save the 'world commons'. Its scope then had to be extended to the atmosphere, with a component of demographic control. But with the stalemates of the UNCLOS III negotiations and the disappointments on the industrial prospects of sea-bed exploitation, dreams of a global eco-government were deflated in the course of the 1970s.

The concept of global commons has nevertheless remained widely used. In 1987, the Brundtland report, which was a preparatory report for the United Nations Conference on Environment and Development (Rio, 1992) and known for promoting the concept of sustainable development, made special reference to it in order to tackle the problems specific to the oceans, to Space, and the Antarctica.[96] With the growing concern for the ozone layer and climate change, the expression was also increasingly used for the atmosphere. Its meaning became more diverse. In 1989, on its fortieth anniversary, the Aspen Institute organized a major symposium on global commons, where very little was said about population growth but which put forward two ideas.[97] First, the fact that climate change would force mankind to manage its

[94] The bibliography on this theme is huge. For a good introduction, see Shigeru Oda, *Fifty years of the law of the sea* (The Hague, 2003).

[95] Elisabeth Mann Borgese, *The ocean regime: a suggested statute for the peaceful uses of the high seas and the sea-bed beyond the limits of national jurisdiction* (Los Angeles, CA, 1968).

[96] World Commission on Environment and Development, *Report of the World Commission on Environment and Development: our common future* (Oxford, 1987), ch. 10.

[97] Harland Cleveland, ed., *The global commons: policy for the planet* (Lanham, MD, and London, 1990).

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global commons better. Second, the need to include in this concept, in addition to physical entities, the world's information flow that spread via television, radio, the telephone, and the fax-machine. The neo-Malthusian connotation of the term had faded definitively.

VII

Much has been said about the importance of the Apollo missions' snapshots of the Earth to the genesis of the environmental consciousness of the sixties and seventies.[98] It is true that one can perceive in these pictures the fragility and the finitude of the planet. But the message conveyed by these images was in reality more ambiguous. For these photographs also served to illustrate, in those same years, the omnipresence of a global ocean from which immense resources could be extracted. This duality between a fragile and limited blue planet and a planet ocean with infinite promises makes more complex the interpretation of the global ecological imagery of the Cold War decades.

A 1973 science-fiction film, *Soylent Green*, directed by Richard Fleischer, starring Charlton Heston and Edward G. Robinson, captured this tension, in its link to the Mathusian question. It was adapted from a book, published in 1966 under the evocative title *Make room! Make room!*[99] by Harry Harrison. In 1999, the Earth had become overpopulated, and transformed into a series of areas surrounded by walls and saturated with slums. The population could survive there only thanks to Soylent Green tablets. This food, made of high-energy plankton, recalled the real-life krill fishing projects. Yet at the end of the film we learn that the oceans themselves were dying. Soylent Green was in fact made from the last available resource, that of human corpses. *Soylent Green is People*.

The vision of the oceans was divided in Cold War culture between symbols of hope and decline. Malthusian thought chose its side, and it was to play a decisive role in formulating and spreading, from this period onwards, the diagnosis of a global fisheries crisis. It thus relayed the warnings of certain fisheries experts, while systematizing them and making them part of a more general discourse on the state of the planet. These warnings on a fishing crisis both acute and global, paved the way to the present-day concerns about a planetary decline of marine life.

[98] Denis Cosgrove, *Apollo's eye: a cartographic genealogy of the Earth in the Western imagination* (Baltimore, MD, 2001); Sheila Jasanoff, 'Image and imagination: the formation of global environmental consciousness', in Paul Edwards and Clark Miller, eds., *Changing the atmosphere: expert knowledge and environmental governance* (Cambridge, MA, 2001), pp. 309–37; Sebastian Grevsmühl, *La Terre vue d'en haut: l'invention de l'environnement global* (Paris, 2014).

[99] Harry Harrison, *Make room! Make room!* (New York, NY, 1966).

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