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Early Twentieth-Century Ocean Science Diplomacy: Competition and Cooperation among North Sea Nations

ABSTRACT

This paper is a response to a 2018 call for greater understanding of how previous examples of marine science diplomacy could help shape present day efforts to draft a new law of the sea that protects marine biodiversity and conserves the marine environment. It tackles this through analysis of the various twists, turns, and challenges of early science diplomacy efforts in marine science during the early twentieth century. It looks in turn at questions of defining and agreeing on research objectives, how backchannel science diplomacy can become official government diplomacy, and finally, how careful science diplomacy brought Germany back to the international research arena so as to successfully put in place marine conservation measures during the 1920s. In doing this, it argues that the foundation of the International Council for the Exploration of the Seas in 1902 represented a revolutionary moment where supra-national scientific research, coordination, and conservation politics for the ocean first emerged; with International Council for the Exploration of the Sea becoming a key model for all subsequent marine science diplomacy.

This essay is part of a special issue entitled *Science Diplomacy*, edited by Giulia Rispoli and Simone Turchetti.

KEY WORDS: science diplomacy, soft diplomacy, oceanography, marine science, North Sea, international relations, fisheries

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The following abbreviations are used: BAAS, British Association for the Advancement of Science; ICES, International Council for the Exploration of the Sea.

Historical Studies in the Natural Sciences, Vol. 50, Number 4, pps. 384–410. ISSN 1939-1811, electronic ISSN 1939-182X. DOI: https://doi.org/10.1525/hsns.2020.50.4.384.

The oceans are a key site for the study of the emergence of science diplomacy during the early twentieth century. Today, international scientific collaboration on the oceans is a duty mandated by international law and organized by international councils, committees, and commissions for various aspects of marine science. As a recent article in the *ICES Journal of Marine Science* affirmed, the need to learn from past examples of science diplomacy in international spaces will be fundamental to contemporary efforts to engage stakeholders (scientific, governmental, and NGOs) in creating new instruments for conservation and developing sustainable use of biodiversity in areas beyond national jurisdiction. We could consider this a move towards a fourth United Nations Law of the Sea.[1]

This article focuses on scientific and diplomatic efforts to forge international agreements on fisheries conservation based on scientific principles. The scientific consensus required to achieve these measures was based on collaboration that combined the coproduction of new scientific instruments and new approaches to the study of the ocean. The combination of fisheries hydrography and fish population studies was central to efforts to create science diplomacy on the oceans and bring about resolutions on environmental protection of fish stocks in the North Sea.

Expansion of coastal fisheries was a critical economic driver for shoreline communities in the late nineteenth century. Many European governments sponsored the activities of fisheries scientists in response to declining fish stocks, which led to the professionalization of the discipline. The fishing industry hoped that biological and hydrographical studies of fish populations would turn the tide of misfortune and increase the size of their catches. As active participants in an expanding marine economy, fisheries scientists formed a key constituent within emerging networks of fisheries diplomacy at the turn of the twentieth century. Fisheries diplomacy, and more specifically science diplomacy for the oceans, as it emerged during the early twentieth century, centered on networks of scientists, government administrators, and industry representatives. Whatever science diplomacy had been up until this point, the new ocean-centered diplomacy of this period grew out of the needs of trade and industry. International agreements were needed to set standards for the

1. Harriet Harden-Davies, "The next wave of science diplomacy: Marine biodiversity beyond national jurisdiction," *ICES Journal of Marine Science* 75, no. 1 (2018): 426–34, https://doi.org/10.1093/icesjms/fsx165.

minimum size of fish to be caught,[2] the maximum amount of fish to be taken, and the share of resources in an environment of dwindling fish stocks.

The need to participate in ocean (science) diplomacy was not necessarily premised on a state's geographical landmass or overall economic power. Instead, it depended on their maritime engagement and prowess. Notably, Britain was at the height of its maritime power at the turn of the twentieth century, but reluctant to involve itself in the development of maritime science. Thus, ocean diplomacy was not always driven by empires. Smaller countries with large maritime economies, security challenges, or coastal regions—such as Denmark, Norway, and Sweden—also played a substantive role in its establishment.[3]

The International Council for the Exploration of the Sea (ICES) was established in 1902 in an age of escalating conflict, nationalism, and imperialism. Global tensions ultimately broke into hostilities in Europe in 1914.[4] Despite this wider context, ICES was founded to further diplomacy. It was intended as a forum to debate the practical applications of ocean science, to foster new technical advances—especially in the North Sea, and to propel international collaboration in order to better conserve national fishery interests. In this period of tension, strategies were devised to maintain channels of scientific communication. In responding to Harriet Harden-Davies's call for present-day ocean science diplomats to "[learn] from past examples of science diplomacy in international spaces," it is important to challenge the notion that science diplomacy is a "port in a storm" for international diplomacy.[5] ICES was fostered within the wider context of (and not despite) rising international tensions.

The history of the formation of ICES has been well documented by Helen Rozwadowski; her 2002 monograph rightfully focused on the individuals who were active in fisheries development and science in the years before the formation of the Council.[6] This article does not seek to challenge this modern

2. The necessity to identify a minimum size of fish to be caught and not returned to the sea, was because of the need to only take adult fish that ideally had reproduced. Taking juveniles had been statistically shown to rapidly reduce fish stocks by reducing the reproduction rates of future fish populations.

3. Matthias Heymann and Janet Martin-Nielsen, "Introduction: Perspectives on Cold War Science in Small European States," *Centaurus* 55, no. 3 (2013): 221–42.

4. Helen Rozwadowski, *The Sea Knows no Boundaries: A Century of Marine Science under ICES* (Seattle: University of Washington Press, 2002) 9.

5. Harden-Davies, "The next wave" (ref. 1), 443, 437.

6. Rozwadowski, *The Sea Knows* (ref. 4), 64–69.

institutional history, but rather to build upon its solid foundations to draw the ICES's historiography into broader current debates surrounding the history of science diplomacy. In particular, it addresses ICES's connection to science and the diplomatic world, its intention to develop ocean science diplomacy, and the ways by which science is shaped through diplomacy and how, in turn, diplomacy has been shaped by science.

Rozwadowski's 2002 monograph provides a detailed account of the cases discussed here, and in particular the case of the post-war exclusion of Germany. The focus here, however, is to use this historical knowledge about ICES's formation to highlight and analyze the role of marine science in the formulation of new norms for international scientific collaboration, arguing that science diplomacy is embedded within science itself and cannot be separated from it. As Rozwadowski argues and this article reinforces, ICES was one of the strongest international scientific organizations in the aftermath of the First World War. It provided a model for international science collaboration in the interwar period and beyond. Since the formation of ICES, many analogous organizations have been inaugurated, taking the politico-scientific basis of this Council as their foundation.

The following discussion is structured around three crucial developments in science diplomacy. Firstly, Britain's reluctance to join international scientific efforts put forward by other North Sea nations—specifically Denmark, Germany, the Netherlands, Norway, and Sweden—and the impact this had on synchronizing a scientific program amongst North Sea nations. Secondly, it accounts for how the break-up of the United Kingdoms of Sweden and Norway propelled leading scientific figures, including Fridtjof Nansen and Sven Hedin, into the diplomacy arena. Finally, it considers how, despite international tensions before and after the First World War, international cooperative efforts that concentrated on fisheries conservation became a vehicle to rebuild science diplomacy and re-admit Germany into the international scientific arena.

This article argues that ICES and its approach to international marine science was revolutionary. ICES established a new model of collaboratively and collectively agreed-upon programs of marine scientific research in order to construct a regionally agreed-upon scientific management policy for the conservation of marine fish stocks. ICES has since become an institutional blueprint for many contemporary structures of science diplomacy due to its recognition of the interconnected nature of science practice and science policy.

THE PROFESSIONALIZATION OF MARINE SCIENCE IN NORTHWESTERN EUROPE

During the nineteenth century marine scientific research emerged in all Northern European nations as an employer of the newly professionalized scientist in response to the rapid industrialization of coastal seas.[7] In Britain, Denmark, Germany, the Netherlands, Norway, and Sweden, coastal seas became a crucial space for scientific research connected to a growing fishing industry that supported rapidly expanding urban populations through three new interconnected technologies.[8] First, railway networks expanded to meet the coastal regions of states bordering the North Sea,[9] offering rapid transportation from fishing areas to urban metropoles, although seafood distribution was not the originally imagined use for these new railway lines.[10] Second, the emergence of refrigerated and insulated railway cars allowed fish to be delivered to markets without the need for traditional salting and smoking. Third, small marine compound steam engines were fitted to trawlers, a technology that allowed them to increase their catches.[11] These technological changes made fish and chips an iconic British national dish as fish was more readily and widely available.[12] The industrialization of the North Sea fishery resulted in greater catches but, consequently, the decimation of fish populations. The demand for increased catches combined with warnings about decreasing fish stocks caused concern for those in government

7. Jack Morrell, "Professionalisation," in *Companion to the history of modern science*, ed. Robert Olby (London: Oxford University Press, 1990), 980–89.

8. Tim D. Smith, *Scaling Fisheries: The Science of Measuring the Effects of Fishing 1855–1955* (Cambridge: Cambridge University Press, 1994), 38–70; Jennifer M. Hubbard, *A Science on the Scales: The Rise of Canadian Atlantic Fisheries Biology, 1898–1939* (Toronto: University of Toronto Press, 2006), 38–66; Vera Schwach, "The Sea Around Norway: Science, Resource Management, and Environmental Concerns, 1860–1970," *Environmental History* 18, no. 1 (2013): 101–10; Janina Priebe, "Science, Markets and Power: Adolf Severin Jensen in the Debate over Greenland's Fisheries Development during the Early Twentieth Century," *Environment and History* 14, no. 3 (2018): 349–75.

9. Robb Robinson, "The evolution of railway fish traffic policies, 1840–66," *Journal of Transport History* 7, no. 1 (1986): 32–44.

10. Ibid., 33. "It is obvious that, in the north at least, few early railways were constructed with the idea that fish traffic would form a principal part of their income."

11. Robb Robinson, *Trawling: The rise and fall of the British Trawl Fishery* (Exeter: University of Exeter Press, 1996). Michael Stuart Haines, *Britain's Distant Water Fishing Industry, 1830–1914: A Study in Technological Change* (PhD dissertation, University of Hull, 1998) http://hydra.hull.ac.uk/assets/hull:3489a/content (accessed Jun 2020).

12. John K. Walton, "Fish and chips and the British working class, 1870–1930," *Journal of Social History* 23, no. 2 (1989): 243–66, https://doi.org/10.1353/jsh/23.2.243.

tasked with managing national fishery industries. States turned to these newly professionalized scientists interested in sea phenomena to investigate the impact of reduced catches whilst supporting the livelihoods of rural coastal communities.

The emergence of coastal marine research stations reflected a new focus on biological and hydrological studies of coastal seas and the emergence of industrial fisheries research.[13] Between 1859 and 1892, Denmark, France, Great Britain, Germany, Italy, Netherlands, Norway, and Sweden all established new marine research institutes.[14] Most of these facilities were established by scientists in collaboration with government agencies, one notable exception being Sweden, where oceanographer Otto Pettersson used his personal wealth to fund a private marine laboratory.[15] These institutions throughout Northwestern Europe represented both the new interest in the science of the seas, as well as the growing entanglement of state resources, politics, and interest in the professionalization of marine science.

OCEAN SCIENCE DIPLOMACY AROUND 1900

Declining fish catches became a pressing problem throughout the North Sea during the 1890s, something that promised to compromise maritime

13. Anthony Adler, "The Hybrid Shore: The Marine Station Movement and Scientific Uses of the Littoral (1843–1910)," in *Soundings and Crossings: Doing Science at Sea 1800–1971*, ed. Helen Rozwadowski and Katharine Anderson (Sagamore Beach MA: Science History Publications, 2016), 145–78.

14. Danish government inspection of fisheries dated back to around 1870; the Dansk Biologisk Station was established in 1889. France operated three sites—at Concarneau (1859), Arcachon (1863), and Roscoff (1871); English fisheries research centered on the Plymouth Laboratory of the Marine Biological Association (1888); in Scotland the Fisheries Board of Scotland established a small laboratory in St. Andrews (1884); Germany established the Königlich Preußische Biologische Anstalt auf Heligoland (1892); in the Netherlands, the Zoölogisch Station der Nederlandsche Dierkundige Vereeniging (1876); Italy inaugurated the Zoological Station in Naples and the Royal Zoological Station in Trieste (1875); in Norway there were various government research sites, notably in Oslo, Bergen, and Trondheim established in the 1890s; Sweden operated the Kristineberg Marine Station (1877). For more on these early establishments, see Thomas Wayland Vaughan, *International Aspects of Oceanography: Oceanographic Data and Provisions for Oceanographic Research* (Washington DC: National Academy of Sciences, 1937).

15. Staffan Bergwik, "Father, Son, and the Entrepreneurial Spirit: Otto Pettersson, Hans Pettersson, and the Early Twentieth-Century Inheritance of Oceanography," in *Domesticity in the Making of Modern Science*, ed. Donald L. Opitz, Steffan Bergwik, and Brigitte Van Tiggelen (London: Palgrave, 2015), 192–214. A. Svansson, "Otto Petterson the oceanographer (1848–1941): Extracts from a biography in preparation," in *Ocean sciences bridging the millennia: A spectrum of historical accounts*, ed. S. Morcos et al. (Beijing: China Ocean Press, 2004), 17–28.

economies and urged both entrepreneurs and statesmen to mobilize scientists in their own countries. Scientists understood that their work would be useful only if they could work together toward specific applied fisheries questions. Collaboration between Swedish and Norwegian scientists in the area of the Skagerrak and Kattegat led to a meeting in 1892 of Scandinavian naturalists in Copenhagen, calling for international investigations of the North Sea.[16] These naturalists, calling themselves the Swedish Hydrographic Commission, undertook investigations with Scottish and German colleagues between May 1893 and February 1894,[17] which were quickly pronounced a success. Immediately after their conclusion, Swedish oceanographer Otto Pettersson wrote in the *Scottish Geographical Magazine*, "I hope that the experience gained from this scientific co-operation will lead to an international agreement about the division of labour, and satisfactorily settle the question of methods and measures to be adopted in the course of future hydrographic survey."[18] These hydrographical surveys combined investigations from a number of fixed stations', work on seasonal cruises, with supplementary observations from lightvessels, using similarly calibrated scientific instruments.[19] This method of data generation became central to hydrographic research undertaken by ICES in the region prior to the Second World War.

Following this successful collaboration, and having secured the backing of King Oscar II, the Swedes announced a second international fisheries science conference to be held during 1899 in Stockholm.[20] This proposal came just before a similar plan was to be announced by the Dutch and Germans, who had been holding discussions for a scheme of simultaneous investigations in the North Sea.[21] It soon became apparent that the proposed Stockholm

16. Arthur J. Lee, *The Directorate of Fisheries Research: Its Origins and Development* (London: HMSO, 1992), 35.

17. Jens Smed and John Ramster, "Overfishing, science, and politics: The background in the 1890s to the foundation of the International Council for the Exploration of the Sea," in *100 Years of Science under ICES: Papers from a Symposium held in Helsinki, 1–4 Aug 2000, ICES Marine Science Symposia* 215 (2002), 13–21.

18. Otto Pettersson, "A review of Swedish hydrographic research in the Baltic and the North Seas," *Scottish Geographical Magazine* 10, no. 12 (1894): 617–35.

19. Jens Smed, "Hydrographic Investigations in the North Sea, the Kattegat and the Baltic before ICES," in *Ocean Sciences: Their History and Relation to Man*, ed. Walter Lenz and Margaret Deacon, (Hamburg: Bundesmat für Seeschiffahrt und Hydrographie, 1990), 357–66.

20. Rozwadowski, *The Sea Knows* (ref. 4), 31.

21. The German plan differed significantly from the Swedish proposal on this; see Rozwadowski, *The Sea Knows* (ref. 4), 21–26; also, W. Herwig, "Über Internationale Untersuchungen der nordeuropäischen Meere im Interesse der Seefischerei," *Mitt. Dtsch. Seefischerei-Verein*

International Fisheries Conference had the potential to fundamentally change international structures of fisheries science and its relationship to politics, diplomacy, and the wider fishing industry. The British, who had enjoyed close links with Sweden for a long time, particularly amongst Scottish scientists, had high expectations for the meeting. Prior to the conference in May 1899, the British Prime Minister Lord Salisbury replied to two deputations from the English and Scottish fishing industries, setting out the British government's vision for how international collaboration would benefit the North Sea fishery. Salisbury was reported in *The Times* as stating:

> as far as its programme has been at present published, we think that it means to devote itself exclusively to what is called its scientific side—a most important side—which I hope will be thoroughly investigated, but there are also many practical questions with respect to the conduct of fisheries at sea . . . [22]

For the Prime Minister there was a clear dichotomy between pure science and practical applied research. British interest lay in fishing rather than marine biology, and this was reflected in its choice of delegates: Walter Archer[23] (Chief Inspector of Fisheries, Board of Trade), and as science advisors Sir John Murray[24] (who had sailed on HMS Challenger and established the Scottish Marine Station in 1894) and Professor D'Arcy Thompson[25] (Chair of Biology, University College of Dundee, and scientific advisor to the Fisheries Board of Scotland). These delegates were all closely involved in undertaking practical scientific studies directly connected with expanding British industry and trade: Archer through his work at the Board of Trade; Murray through work in connection with the phosphate industry on Christmas Island; and Thompson,

(1904): 112–22; F. Heinke and H. Henking, "Dr. Walter Herwig: Präsident des Deutschen Seefischerei-Vereins, Ein Gedenkblatt," *Mitt. Dtsch. Seefischerei-Verein* (1913): 92–136.

22. "Great Britain, Denmark, and the Fishery Troubles: A Line Fishermen's Deputation," *The Times (London)*, 13 May 1899.

23. Lee, *The Directorate* (ref. 16), 36; W. E. Archer, *Report of the Committee appointed to inquire into the Scientific and Statistical Investigations now being carried on in relation to the Fishing Industry of the United Kingdom* (London: HMSO, 1908).

24. J. H. Ashworth & E. Mills (2004, Sep 23), "Murray, Sir John (1841–1914), marine scientist and oceanographer," *Oxford Dictionary of National Biography*; https://doi.org/10.1093/ref: odnb/35165 (accessed 29 Jan 2019) Harold L. Burstyn, "Science Pays Off: Sir John Murray and the Christmas Island Phosphate Industry, 1886–1914," *Social Studies of Science*, 5 (1975): 5–34.

25. W. T. Calman, "Thompson, Sir D'Arcy Wentworth (1860–1948), zoologist and classical scholar," *Oxford Dictionary of National Biography*; https://doi.org/10.1093/ref: odnb/36486 (accessed 29 Jan 2019).

who had recently completed a report for the government on the seal fur trade in the Bering Straits. That Murray and Thompson were working in Scotland was no coincidence; since 1892, the Fishery Board for Scotland had been working closely with the Swedes, and specifically Pettersson, to conduct research in the North Sea.[26] The British position was clear: if they were to take part in international investigations, the main objective had to be answering "whether any existing methods of fishing were, or were not, exercising a detrimental effect upon the supplies of fish in the waters in question," and any wider benefit to science that came from these investigations had to be ancillary to this main objective.[27]

British officials argued that a commitment to a formal fisheries treaty was a pre-condition for conducting any research.[28] On November 9, 1899, *Nature* published a report of the conference, focusing on its proposed hydrographical and biological work in the North Sea.[29] The conference called for scientific cruises in four different months, one typical of each season, on clear lines of stations, with each being the direct responsibility of one nation. This called for effort from Britain, Denmark, Finland, Germany, the Netherlands, Norway, and Russia. However, the conference proposals soon came in for criticism from English scientists, showing divisions within Britain concerning their government's focus on trade.[30]

This criticism emerged in a series of letters published in *Nature* over the coming months. On November 16, the Director of the Plymouth Laboratory of the Marine Biological Association, Dr. E. J. Allen, wrote a letter in which he complained that the proposals focused too heavily on hydrographical rather than biological research. For Allen, rather than establishing new research institutions, "the most satisfactory course for the British government to pursue is to develop and as far as possible coordinate the work of the various organisations already in existence."[31] Allen asserted that "the chief argument in favour of international co-operation [is] that any attempt to regulate the fisheries of

26. Lee, *The Directorate* (ref. 16), 35; H. N. Dickson, "Report on physical investigations carried out on board HMS Jackal 1893–1894," *Report of Fishery Board for Scotland* 12 (1894): 280–86.

27. Lee, *The Directorate* (ref. 16), 37.

28. Ibid.

29. "The Stockholm International Fisheries Conference," *Nature*, 9 Nov 1899.

30. Although technically a single nation, fisheries science was managed by two separate organizations in Great Britain: the Scottish Fisheries Board co-ordinating research in Scotland, and the Marine Biological Association in England.

31. E. J. Allen, "Letter," *Nature*, 16 Nov 1899.

the high seas can only be carried out by international agreement."[32] In his opinion, Lord Salisbury's position that practical science had to come before pure research was flawed, noting that international cooperation in pure science was not ancillary but a fundamental pre-requisite to making international agreements concerning delicate environments.

William Herdman, Liverpool-based Professor of Zoology, gave his support to Allen on November 23, 1899, arguing that "most fisheries disputes and differences of opinion are due to the absence of . . . exact knowledge."[33] For Herdman, diplomacy was the last thing that was required, stating that "what we want, at the present time is not conferences, or committees, or a central bureau, so much as boards and men, and work at sea." Whilst this was perhaps a naïve assertion—that state-funded science could be organized internationally amongst scientists without state oversight and co-ordination—it also reveals some of the frustrations scientists had in Britain regarding the management of domestic marine science. Further letters asked, why had there been no coordination of British marine stations before? And, why had scientists not yet established a research station on the North Sea, when this fishery was such a large component of the marine economy? Others lamented the reluctance of the government to spend any money on science rather than applied fisheries policy in the form of Royal Navy fisheries protection vessels.[34]

The British government was not against collaboration *per se*, but rather objected to the characterization of that collaboration: the focus on science rather than the practical problems of needing to land more fish from already depleted stocks. In line with traditional diplomatic practices of using backchannels, British officials did not openly challenge international cooperative efforts, but rather voiced their concerns through their chief Swedish ally. On March 1, 1900, Pettersson stated, "I fully agree with Prof. Herdman that the biological part of the program needs further development before it can be put into execution."[35] Despite the promise of the 1899 conference, the British government remained concerned with the scientific rather than the practical orientation of the proposed work. They informed the Swedish government that they would initially commit to supporting only two years of work.

32. Ibid.

33. W. A. Herdman, "Letter," *Nature*, 23 Nov 1899.

34. George Murray, "Letter," *Nature*, 30 Nov 1899; H. M. Kyle, "Letter," *Nature*, 14 Dec 1899; W. A. Herdman, "Letter," *Nature*, 21 Dec 1899; E. J. Allen, "Letter," *Nature*, 4 Jan 1900; E. J. Allen, "Letter," *Nature*, 18 Jan 1900.

35. Otto Pettersson, "Letter," *Nature*, 1 Mar 1900.

A subsequent conference in Kristiania in 1901 made significant alterations and clarifications to the proposed program of work. This new framing highlighted the applied nature of the investigations, the practical challenges it would seek to address, and finally persuaded the British Cabinet to agree to full participation in international investigations.[36]

INSTITUTIONALIZING OCEAN SCIENCE DIPLOMACY

The formation in July 1902 of ICES brought about a five-year program of fisheries science.[37] The success of the initial two years of work, begun in 1900, persuaded the British Foreign Office in January 1902 to inform the Swedish and Norwegian governments that they were prepared to contribute £38,000 toward three further years of work.[38] Despite initial reluctance and hesitance, the British, German, and Dutch governments were warming to the utility of international scientific cooperation in the North Sea. Although it began as a temporary structure reliant of shifting memberships and priorities for practical versus academic research, the Council shifted away from its temporary standing. But in its early years, ICES's future was never entirely secure.[39]

ICES was founded to coordinate, undertake, and promote research in fisheries science on behalf of member states, mostly Western European, and from the outset did not include the United States.[40] Member states both provided financial support and were obliged to establish research stations that would contribute scientific data, instruments, and personnel to efforts prioritized by the council, rather than the member state. This marked a revolutionary change in the structure of international collaboration in marine science by creating a transnational body existing at the supra-national level not only to coordinate scientific activity—which was not novel—but whose findings would also compel its members to agree on regional fisheries protection policies based on scientific findings—which certainly was. This was a transnational effort, the latest of

36. Rozwadowski, *The Sea Knows* (ref. 4), 31. There is not the space to detail this discussions here; for an excellent account, see ibid., 31–41.

37. Rozwadowski, *The Sea Knows* (ref. 4), 42.

38. Lee, *The Directorate* (ref. 16), 45.

39. Rozwadowski, *The Sea Knows* (ref. 4), 42.

40. Ibid., 43–44. The United States and ICES have had a complex history. The USA joined in 1912, but left at the outset of WWI having contributed little, re-joining in 1973 and remaining a member ever since.

a wave of hydrographic science congresses held since the 1850s that had seen increasing support from state authorities.[41]

In the years prior to 1914, the direction of research in ICES was shaped by Dutch, Danish, Norwegian, and German scientists, although there was significant British involvement in the formation of policies in the ICES council. Despite its "international" name, ICES was specifically regional, not global, in its outlook, prioritizing issues in European seas, and in particular the North Sea. This was a reflection of the trade interests of countries such as Britain and Germany, who did not see a need for research in the Atlantic where fish stocks remained healthy—research avenues that the Swedes and Norwegians expected.

ICES's interest in the North Sea stemmed from concerns surrounding declining fish stocks. The ecosystem of the North Sea provided fishing grounds for all the countries with adjoining coastlines. Whilst this was a significant source of protein in certain countries, its trawlers also easily landed fish from the North Atlantic, which balanced the North Sea decline but was of little help to local economies. This may go some way to account for the passive role played by the British State before the First World War in the ICES projects, for whom this region had never been a primary concern. Nevertheless, the North Sea fishery had provided fertile grounds before the advent of the steam-powered trawler, which was blamed for depleted catches.[42]

Blaming new technology, including the steam trawler, for the stock crisis was unpopular with fishermen, who valued the ability to fish where they pleased, when they wanted, and to return to port with a fresh catch without being beholden to wind and tide.[43] The ICES mission in the North Sea was not merely to prove whether steam trawlers had overfished the waters, but to consider the environmental factors that may have contributed to this decline.[44] In order to monitor environmental change, it was first necessary to agree on the

41. Azadeh Achbari, "Building Networks for Science: Conflict and Cooperation in Nineteenth-Century Global Marine Studies," *Isis* 106, no. 2 (2015): 257–82; Pierre-Yves Saunier, *Transnational History* (London: Palgrave Macmillan, 2013), 85–86.

42. Lee, *The Directorate* (ref. 16), 13.

43. Between 1889 and 1898, the number of steam trawlers operating on the southeast coast of England had risen from 146 to 698. See Walter Garstang, "The impoverishment of the sea," *Journal of the Marine Biological Association of the UK* 6, no. 1 (1900): 1–69; Walter Wood, *North Sea Fishers and Fighters* (London: Kegan Paul, Trench, Trubner & Co. Ltd, 1911); Georg H. Engelhard, "One hundred and twenty years of change in fishing power of English North Sea trawlers," in *Advances in Fisheries Science: 50 years on from Beverton and Holt*, ed. Andrew I. L. Payne, John Cotter, Ted Potter (London: John Wiley & Sons, 2009), 1–25.;

44. Rozwadowski, *The Sea Knows* (ref. 4), 54.

characteristics of the sea space of the North Sea, which despite being a key European trading route and fishery for hundreds of years was scientifically understudied. Although this amounted to a small geographical area, no one nation could carry out such extensive surveying single-handedly, hence the need for scientific cooperation to gain a synoptic insight into the hydrographic conditions of these waters.

In this period fisheries science was synonymous with biological studies of populations. However, ICES committees were influenced by contemporary studies of the physical properties of the sea environment and its relation to the biodiversity of the oceans. This set the groundwork for the first hydrographical studies of fisheries,[45] which linked hydrographical work with population studies and required an understanding of the turbulent and unpredictable climatic conditions of the North Sea.[46] Whilst the hydrography, in terms of sea bed topography and tidal patterns, was relatively well known, the patterns of currents and how these affected the migrations of fish populations emerged as a nascent area of study in this period.

Hydrographic research required the use of expensive scientific instruments, and from the earliest days of ICES a central laboratory was planned and established to coordinate loans of equipment to member nations undertaking hydrographical work. After some discussion regarding location, the central laboratory was established in Kristiania, overseen by Fridtjof Nansen but operated day-to-day by Johan Hjort.[47] Nansen understood that Norwegian operations could be far more effective if a central instrument depository was established. The laboratory supplied state-of-the-art equipment such as water bottles, thermometers, and plankton nets. Despite it being an "international" repository, the Norwegians made greatest use of it and contributed a significant volume of data to early ICES studies. The laboratory allowed Nansen and his colleague, the oceanographer Vagn Walfrid Ekman, to work toward improving hydrographic instruments; this was a passion of several ocean scientists and the basis of many subsequent collaborations. As with many international projects, these early years were shaped by national agendas and priorities, as transnational science took time to develop.

45. Ibid., 43–50.

46. The lack of such work was lamented by Garstang; see Garstang, "The impoverishment" (ref. 43).

47. Rozwadowski, *The Sea Knows* (ref. 4), 45.

THE CHALLENGE OF DOMESTIC AGENDAS

The ICES council was vulnerable to shifting domestic politics of its member states, and science diplomacy was of significance not only to scientific affairs. With the dissolution of the union between Norway and Sweden, Fridtjof Nansen was appointed by Norway as its "ambassador" to London. The architects of ICES were Pettersson (Swedish) and Nansen (Norwegian), and in 1905, they found themselves on opposing sides during the breaking up of the union between the Kingdoms of Sweden and Norway. This moment allowed Nansen to enter the world of state-to-state diplomacy under the personae of a scientist and polar explorer rather than a politician.

An ardent supporter of Norwegian independence from Sweden, Nansen was dispatched to London under the cover of giving a lecture to the Royal Geographical Society.[48] Nansen timed his arrival in London on March 25 to coincide with the publication of a letter in *The Times* newspaper that bore his signature calling for Norwegian independence, signalling his role as a proactive ambassador.[49] Despite carrying Nansen's signature the letter was drafted by the Norwegian Ministry of the Interior using Nansen's self-fashioned image as a scientist and explorer to make statements from the perspective of a concerned leading citizen.[50] The letter presented the legal case for separate Norwegian and Swedish consulates—a subject sufficiently fiery that *The Times* published a leading article commenting on his letter in the same issue. The accompanying article also took particular care to frame Nansen not as a diplomat, but as the scientist-explorer maintaining his cover:

> His fame as an explorer, his prowess in the Furthest North, have given him a unique place in the affections of Norway, just as they have made his name known and honoured throughout the length and breadth of Europe.[51]

Nansen recorded in his diary that he was playing "the diplomat and servant of the gentlemen of the press."[52] Nansen was received by the Foreign Secretary, Lord Lansdowne, despite the scientific focus of his visit, a move that signalled

48. Roland Huntford, *Nansen: The Explorer as Hero* (London: Little, Brown & Co., 1997), 401.

49. Fridtjof Nansen, "The Swedish-Norwegian Conflict," *The Times (London)*, 25 Mar 1905, p. 7.

50. Huntford, *Nansen* (ref. 48), 402.

51. "We print this morning a weighty letter on the Scandinavian crisis from the pen of Dr. Nansen. . . ." *The Times (London)*, 25 Mar 1905, p. 11.

52. Huntford, *Nansen* (ref. 48), 403.

the British government's willingness to reconsider their traditional alliance with the Swedes in maritime and non-maritime affairs, toward a dual recognition.[53] The Swedes were not happy with the Norwegian propaganda campaign and the audience granted to Nansen by Lansdowne, and they decided to respond in kind. On April 1, a letter appeared in *The Times* putting forward the Swedish case and signed by their own explorer, Sven Hedin.[54]

Hedin was essentially the Swedish Nansen, albeit celebrated not for polar exploration but for his exploits as an explorer and geographer in Central Asia and Tibet.[55] Indeed, Nansen and Hedin had known each other for more than twenty years and were friends. A series of bad-tempered exchanges now ensued in the letter pages of *The Times*. However, as Nansen's biographer Roland Huntford points out, rather than this being a spat between two opposing "national heroes," "they allowed their names to be used by their respective governments to present official views in an unofficial guise."[56] Nansen's "letter" did not have an impact only in London; it was translated and reprinted in French in *Le Temps* and German in the *Kölnische Zeitung*.[57] In June 1905, Nansen published a book, *Norway and the Union with Sweden*, in English, French, and German; this too was carefully prepared by officials in the Norwegian Ministry of the Interior.[58]

Throughout this episode Nansen allowed his prestige as a scientist-explorer to be used by diplomats to exert diplomatic pressure. The resulting ruckus affected all public aspects of Swedish-Norwegian cooperation in science. Despite this, friendships and correspondences were maintained in private. Whilst privately the norms of scientific exchange might have been maintained, diplomatic tensions bled over into international initiatives such as the newly established ICES. Without Nansen's active involvement in marine science at this time, Norwegian support for the council's central laboratory waned, and ultimately it was forced to close in 1908.[59]

The original five-year term of the council had now passed, and its members were reluctant to commit to more than one or two years at a time. With the closure of the central laboratory, marine scientific instrument expertise passed

53. Ibid, 403.
54. Sven Hedin, "The Swedish-Norwegian Conflict." The *Times (London)*, 1 Apr 1905, p. 12.
55. Sven Hedin was most well known in Britain for his publication, *Through Asia* (1898).
56. Huntford, *Nansen* (ref. 48), 404.
57. Ibid., 405–06.
58. Ibid., 406.
59. Rozwadowski, *The Sea Knows* (ref. 4), 46–47.

to the Danish Hydrographic Laboratory from at least 1912 onward. But the impetus to host and fund a central depository of state-of-the-art instruments—a continuing goal of the hydrographers—found no governmental support as the climate of international relations in Europe turned increasingly hostile. It was in this antagonistic climate that a design for a Second Polar Year floundered.[60] By the 1910s, it was not only marine science that found itself struggling to operate in an increasingly tense international arena.

REBUILDING MARINE SCIENCE COLLABORATION IN THE NORTH SEA AFTER 1918

On August 4, 1914, the First World War began and marine science collaboration was put into dry dock. Although Norway, Sweden, Denmark, and the Netherlands remained uneasily neutral throughout the conflict, Britain and Germany found themselves on opposing sides. In February 1915, ICES president, Germany's Fritz Rose, resigned and on behalf of the German government withdrew from the Council. The presidency passed to Sweden's Otto Pettersson.[61] The war years were a period of planning, brooding, and ultimately frustration for marine scientists in neutral countries. The heavily mined North Sea and the unrestricted submarine warfare of the Atlantic restricted access to the oceans for belligerent and neutral alike. The British were the only belligerent nation to maintain their ICES payments throughout the war, and in doing so they reinforced their position of seeking a speedy return to peace and normality in intra-European relations.[62]

Before the end of hostilities in May 1918, neutral European member states of ICES met to discuss rebuilding post-war research collaborations. Present at the meeting were delegates from Denmark, Norway, Sweden, and the Netherlands. One outcome of this meeting was a commitment to place a Swedish lightship in the North Sea to conduct measurements, thereby re-starting the

60. Peter Abbink, *Antartic Policymaking & Science in the Netherlands and Germany (1957–1990)* (PhD thesis, University of Groningen, 2009; Eelde, NL: Barkhuis, 2009), 46; Cornelia Lüdecke, "The Belgian attempt to institutionalize polar research (1905–1915) and the German point of view," in *The Belgica expedition centennial: perspectives on Antarctic science and history*, ed. H. Decleir & C. de Broyer (Brussels: VUB Brussels University Press, 2001), 161–69.

61. Bo Poulsen, *Global Marine Science and Carlsberg: The Golden Connections of Johannes Schmidt (1877–1933)* (Lieden, NL: Brill, 2016), 219–21. "Marine science in dry dock" is Poulsen phraseology.

62. Lee, *The Directorate* (ref. 16), 100.

hydrographic program and continuing the work carried out by Dutch vessels. Given that the Dutch and the Germans had historically worked closely together on hydrographic research in the North Sea, this suggestion to bring Swedish science into another sphere of geopolitical interest should have had the result of bringing British-Swedish collaboration together with Dutch-German cooperation. To achieve this ambition the practical needs of science would have to overcome marked political divisions and generate a collaborative atmosphere between one-time enemies. This motion toward unity, however, did not come to pass.[63]

After the cessation of hostilities, the ICES Council looked to expand its membership and push outward into new seas.[64] During the post-war years new research programs were discussed for the Northeast Atlantic and in the Baltic seas that in turn brought new members to ICES. Expansion into the Atlantic brought in France and Portugal in 1920, Spain in 1924, and a newly independent Ireland in 1925. Meanwhile longstanding members of the Council, Otto Pettersson and Christian Dreschel, looked eastward to the newly independent states formed in Eastern Europe. This resulted in Poland joining in 1922, Latvia in 1923, and Estonia in 1924.[65] Of the nine pre-war members, Germany was now excluded as part of a wider ban on German participation in international science. The Bolshevik revolution in Russia in 1917 also resulted in the Soviets leaving. The number of nations with representation at the Council increased to fifteen, doubling the size of the organization. Despite these new developments, it is worth focusing upon how the Council rebuilt pre-war research collaborations and priorities. While there was expansion at this time, another new development was the greater, government-supported, participation of the British.

At the 1919 meeting of the British Association for the Advancement of Science (BAAS), that year's President, Professor William A. Herdman, a marine biologist at the University of Liverpool, used his presidential address to lambast the government for historic inefficiencies in the scientific management of the fishing industry. In a long address that discussed the international

63. Rozwadowski, *The Sea Knows* (ref. 4), 62.

64. The history of the Council during this period is well documented by Helen Rozwadowski in her institutional history of ICES; Helen M. Rozwadowski, "Internationalism, Environmental Necessity, and National Interest: Marine Science and Other Sciences," *Minerva* 42 (2004): 127–49. See also Rozwadowski, *The Sea Knows* (ref. 4), 59–69.

65. On Estonia participation, see Bernt I. Dybern and Stig Fonselius, "International Marine Scientific activities in the Baltic Sea with special reference to Estonian participation," *Proceedings of the Estonian Academy of Sciences, Biology and Ecology* 50, no. 3 (2001): 139–57.

nature of the emerging science of oceanography in Europe, Herdman stated that as "a maritime people . . . [we] owe everything to the sea." Concluding his address.

> National efficiency depends to a very great extent upon the degree in which scientific results and methods are appreciated by the people and scientific investigation is promoted by the Government and other administrative authorities. The principles and discoveries of science apply to aquiculture as much as agriculture. To increase the harvest of the sea the fisheries must be continuously investigated, and such cultivation as is possible must be applied, and all this is clearly a natural application of the biological and hydrographical work now united under the science of oceanography.[66]

In 1920, the British civil servant Henry Maurice replaced Otto Pettersson as President of ICES.[67] The appointment of a British official was a deliberate move by Pettersson (Swedish) and Dreschsel (Danish), who believed that the survival of the Council was reliant on senior representation from the largest European sea power: Britain. Maurice had headed the Fisheries Department at the British Ministry of Agriculture and Fisheries since 1912.[68] Despite the requirement for annual elections for the office of ICES President, Maurice would serve in this office until his retirement in 1938. The appointment of a British president also reflected recent debates in Britain at the 1919 BAAS meeting on the need for fisheries science, regulation, and government support for the industry.

The need for government support, and the shift toward it, was reflected in the Zoology Section of the same meeting. Henry Maurice (British delegate to ICES) organized a session titled "The Need for the Scientific Investigation of Fisheries," and in his opening address Maurice was clear where responsibility for fisheries research lay, stating that they were "primarily a matter for the state."[69] This represented a definite shift from earlier British notions of the responsibility of industry to fund scientific research. Maurice felt such a shift of responsibility was justified because of the role of the fisheries in providing a cheap food source to the nation during times of war. But the challenges of overfishing were not national; they required international cooperation and agreement, which necessitated state intervention:

66. William A. Herdman, "Oceanography and the Sea-Fisheries: Presidential address delivered at the Cardfiff meeting of the British Association on August 24," *Nature*, 26 Aug 1920, 813–25.

67. Rozwadowski, *The Sea Knows* (ref. 4), 75–76.

68. Lee, *The Directorate* (ref. 16), 100.

69. Henry G. Maurice, "Science and Fisheries," *Nature*, 25 Nov 1920, 419.

> If . . . scientific investigations point to the necessity or desirability of regulations for the closure of certain areas of the sea . . . it is essential that those measures should be adopted internationally in order that the good which one nation is endeavouring to do may not be undone by another nation which refuses to co-operate. If we are to have international regulations based upon the findings of science, those findings must be internationally accepted, and the simplest road to such general acceptance is co-operation in the work.[70]

In part Maurice's address was a call for cooperation to ease subsequent diplomatic efforts to bring about fishery regulation, but it also reminded delegates that ICES's mission was to bring about regulation with a scientific rationale. In his paper he also reiterated the argument that the scale of the oceans was too vast for any one nation to hope to single-handedly undertake the necessary investigations without incurring massive costs. Britain had a role to play in this; for Maurice, "combined international investigations are essential, and to none are they more important than to the greatest sea-fishing nation in the world."[71]

The British had begun to question whether smaller catches resulted from a lack of modern methods amongst British trawlermen. Before the First World War, the productivity of the German fishing fleet had drawn admiration from British fishermen. German trawlers landed nearly 25 percent of the catch recorded at Aberdeen, Scotland, in 1913.[72] Although this fleet was small, it was modern. An anonymous author in *The Scottish Review* in 1918 pointed out that they were equipped with "wireless" so as to keep in touch with each other at sea and with markets ashore.[73] The First World War had decimated fishing fleets; the British estimated that they had lost 3,338 fishermen during the conflict, and the North Sea now contained about 191,000 sea mines in 40,000 square miles of ocean, all of which needed clearing before the fishing industry could return.[74] However, as Herdman had told the BAAS in 1919, the war represented

70. Ibid., 420.

71. Ibid.

72. "John Dory" [pseud.], 'The Future of the Fishing Industry', *The Scottish Review* (Dec 1918): 457–69. Note: *The Scottish Review* was a Scottish Nationalist periodical advocating for an independent Scotland and Scottish-controlled fisheries.

73. Ibid., 466.

74. Robb Robinson, "A forgotten navy: Fish, fishermen, fishing vessels and the Great War at sea," *Journal for Maritime Research* 19, no. 1 (2017): 58. See also Captain Taprell Dorling, *Swept channels: Being an account of the work of minesweepers in the Great War* (London: Hodder and Stoughton, 1935).

"the most gigantic experiment ever seen in the closing of extensive fishing-grounds," referring specifically to the North Sea.[75] Britain, Germany, and the Netherlands now sought to collaborate to explore the results of this "gigantic experiment." If four years of closure had allowed stocks to recover, then maybe overfishing really was the problem, not the hydrographic or evolutionary changes that had been advocated by those who had denied overfishing was responsible. For all member nations, it was still the need to maintain their fishery industry despite dwindling stocks that drove continued commitment to international ocean science diplomacy.[76]

Building on Maurice's notion of the need to build trust in the science and ease the path of ocean diplomacy came the need to study the impact of four years of war. An early task of the reopened maritime laboratory at Lowestoft, on the English East Coast, was to devise a scheme of work that was cheap, could cover a large part of the North Sea synoptically, and allowed for participation by other Southern North Sea coastal nations.[77] This work fell to a new appointee at Lowestoft, James Norman Carruthers, who joined in 1921, after serving on the Western Front during the war and subsequently completing a geology degree at the University of Leeds. Carruthers's first task was to study North Sea currents using drift bottles. An idea that circulated at the time was that fish schools drifted with the currents, and knowledge of these might help fishermen increase their trawl catch. However, Carruthers found the drift bottles crude, and he began to design his own scientific instruments—in particular, current meters. These instruments had been developed by Gustaf Ekman at the end of the nineteenth century and were preferable to drift bottles because they provided quantitative data and did not rely on the slips inside drift bottles being accurately filled out and returned to the laboratory. His work to modernize current measurement techniques brought him to prominence within ICES, and he began to become well known to European colleagues through his work for the ICES Southern North Sea Committee, eventually being given the title of "recorder of currents." Operating within European networks allowed Carruthers to construct and conduct a large-scale international current-monitoring project in the Southern North Sea during the

75. Herdman, "Oceanography" (ref. 66), 823.

76. Rozwadowski, *The Sea Knows* (ref. 4), 64.

77. On trust in international marine scientific cooperation, see Jacob D. Hamblin, "Visions of International Scientific Cooperation: The case of oceanic science, 1920–1955," *Minerva* 38 (2000): 393–423.

1920s that involved fourteen lightships anchored in the Southern and German bights of the North Sea, involving British, Dutch, and German Scientists.[78]

The research program devised by Carruthers centered on the need to design economic research packages that allowed for international cooperation with the aim of developing international regulations. Carruthers decided to base his experiments on lightships.[79] This was a marked departure from the earlier work, which had involved costly research vessels. The lightship scheme used non-scientifically trained crewmen, whose work at sea was both necessary for navigation but also usually came after a lifetime spent acquiring seamanship skills as fishermen, merchant seamen, or coast guard. Use of lightships predated ICES; they had been being utilized as floating instrument platforms for forty years by Otto Pettersson in the Kattegat between Denmark and Sweden.[80] Carruthers devised an instrument that combined the features of the British Robinson Anemometer and the Norwegian-designed Ekman Current Meter.[81] The drift indicator program was an instance of ICES collaboration that combined national instrument-making expertise with the use of amateurs as data collectors. The lightvessel experiments were designed to ascertain the flow of water past a specific sea strait or area of water mixing. Eventually lightvessel crews were able to take measurements on a daily basis, and the results were recorded on a simple sheet provided by the Ministry of Agriculture and Fisheries and returned to the laboratory for statistical analysis.

This work was frustrated by the continued exclusion of German scientists from the international scientific community. It had become clear in the late nineteenth century that the only acceptable fisheries protection measure would include all the nations who engaged in the industry, and that measures would need to be backed up by national scientific programs that collectively built a synoptic picture of fish stocks in the area of the North Sea. Exclusion of much German research from the area around the Southern North Sea, and in particular Heligoland, left a gap in ICES modelling. Carruthers's program was

78. John Ramster, "Dr J. N. Carruthers," *Journal du Conseil International pour l'Exploration de la Mer* (1975): 101–05.

79. J. N. Carruthers, "A New Drift Indicator," *Nature* 114 (1924): 718–19.

80. Otto Pettersson, "Hydrography, Climate, and Fisheries in the Transition Area," *Journal du Conseil International pour l'Exploration de la Mer* (1926): 305–21.

81. J. N. Carruthers and H. J. Garrood, "A new Current Measuring Instrument for the Purposes of Fishery Research," *Journal du Conseil International pour l'Exploration de la Mer* (1926): 127–39. An example of this instrument is held in the collections of the National Maritime Museum Greenwich (item: NAV0981).

important for usurping the prohibition on German marine science as the results that it generated, maintained a flow of new data from German "areas" of the North Sea packaged as British science. Use of this data relied on back-channel cooperation between Lowestoft and German scientists. The need for a synoptic and complete scientific model to enact conservation measures, along with the preposterousness of repackaging German research as "British," resulted in strengthened calls from ICES members for Germany's re-admittance to the international scientific community. The needs of fisheries science diplomacy was a central driver of efforts to overturn the International Research Council's stand against the re-admittance of Germany into international science affairs.

RE-ADMITTING GERMANY

Since the formation of the International Research Council by the Allied powers in 1918, German science, scientists, and institutions had been excluded from international bodies such as ICES.[82] This blanket ostracism was driven largely by the French government. Wider support for the exclusion came as a direct result of statements made by German scientists in 1914 supporting German war aims, and their subsequent "collusion" with war activities, including the production of chemical weapons. The hypocrisy of the French and Allied governments' positioning was startling considering the involvement of scientists of all belligerent nations in supporting their militaries through research and development in wartime. The bar on German involvement in post-war international science had little to do with science and everything to do with the wider humiliation of Germany in the wake of the cessation of hostilities and, in particular, in the articles of the Treaty of Versailles. The exclusion became particularly problematic when German research data was necessary to complete scientific understandings of climatic conditions, as was essential in North Sea fisheries research and, in particular, Carruthers' work. During the period of German exclusion (1918–1926) several channels of communication were used to circumvent the exclusion.[83] However, the exclusion

82. Robert Fox, *Science without Frontiers: Cosmopolitanism and National Interests in the World of Learning, 1870–1940* (Corvallis: Oregon State University Press, 2016), 57. Frank Greenaway, *Science International: A History of the International Council of Scientific Unions* (Cambridge: Cambridge University Press, 1996), 19–32.

83. Rozwadowski, *The Sea Knows* (ref. 4), 65–6.

did not only have scientific consequences; it also threatened efforts to implement scientific-driven fisheries conservation measures.

One of the earliest efforts to implement fisheries regulation on the basis of pre-war fisheries science was in the implementation of regulations on the plaice fishery. Fisheries conservation, driven by and based on scientific data, had been a long-term ambition of several scientist participants of ICES. The results of post-war research became available for comparison with pre-war work in 1921, immediately prompting renewed calls for fisheries conservation measures. The plaice fishery was a Southern North Sea problem. A question emerged almost immediately regarding the potential participation of the Germans, even though, as Maurice accepted at the time, implementing a plaice protection convention would be impossible without Germany signing such a treaty. Dutch delegates pushed for the re-entry of Germany into ICES to enable satisfactory regulation to be implemented. However, this was politically challenging and the immediate return of German participation was impossible. Instead, a system of informal communication began: a backchannel for German scientists. As Rozwadowski argues, "the Council was in a better position to move forward after the war than were typical scientific congresses, which lacked the necessary institutional culture from which to rebuild working relationships."[84] This was certainly the case, but the political and scientific exclusion of Germany soon became a significant obstacle.

ICES needed data from German areas of the North Sea for its fish stocks modelling and wider study of fisheries hydrography. Backchannels between scientists enabled communication of the work of the German Commission for Marine Science (Deutsches Wissenschaftliches Kommission für Meeresforschung, DWK), and in return German scientists where kept informed by colleagues of the debates inside the Council from which they were otherwise excluded. Central to this was Otto Pettersson, who maintained a correspondence with former German colleagues whilst also remaining the close confident of Maurice and Drechsel.[85] With private communication re-established, the way was paved for bilateral research between Britain and Germany that was officially outside the auspices of the Council.

In 1925, this ICES method of organizing a meeting but making it a non-Council gathering of experts was used to invite German scientists to

84. Ibid., 65.
85. Ibid.

Amsterdam to finally ratify regulations on the plaice fishery.[86] With Germany unofficially re-admitted, their exclusion was becoming increasingly difficult to maintain. In the spring of 1925, France and Britain agreed that French and English would remain the only two official languages of the Council regardless of who was admitted, or re-admitted, in the future, thus overturning the longstanding principle that articles in English, French, German, or Spanish would be published in the *Journal du Conseil*.[87] Elevation of their language to official status placated the French, whose broader diplomatic priority was to maintain their language as the *lingua franca* of international diplomacy, and there was no objection from other members who sought German re-admission over issues of national linguistic pride.[88] Eventually in 1926, Germany was re-admitted to the Council, not only because of its participation in North Sea fisheries regulation, but also due to the expansion of ICES Baltic activities—a sea with a coastline and emerging research interests in Germany.

Carruthers's lightvessel experiments brought British and German scientists back together after the divisions of the First World War. The continued focus on the Southern North Sea revealed both a desire to continue to focus on the North Sea by some nations whilst also reflecting the divisions within ICES at the time with ambitions to expand the geographical scope of the Council's work. Ultimately through renewed scientific programs such as the lightvessel programs, former belligerents found a degree of consensus and reconciliation with one another. Through the 1920s and into the 1930s, and despite financial pressures, the British and Germans were able at least nationally, if not within the transnational framework of ICES, to achieve both research ambitions: pushing the geographical scope of ocean research whilst renewing and expanding fisheries studies programs. Through the Discovery Investigations and the Meteor Cruise, both managed to push their oceanographic research activities onto the global oceans, the Atlantic in the German case and Antarctica in the

86. Ibid, 68.

87. Arthur E. J. Went, *Seventy Years Agrowing: A history of the International Council for the Exploration of the Sea* (Copenhagen: ICES, 1972), 68, 118.

88. On language in international science, see Michael D. Gordin, *Scientific Babel: How Science Was Done Before and After Global English* (Chicago: University of Chicago Press, 2015); on the fight to maintain French as the language of diplomacy, see Keisuke Kasuya, "Discourses of Linguistic Dominance: A Historical Consideration of French Language Ideology," *International Review of Education* 47 (2001): 235–51; Jeffra Flaitz, *The Ideology of English: French Perceptions of English as a World Language* (Berlin: Mouton de Gruyter, 1988).

British. Despite this, the North Sea remained central to their international ocean science diplomacy-making.

CONCLUSION

This article has shown that the development and promotion of marine science diplomacy in the early twentieth century was anchored in the needs of, and competition between, the maritime economies of nations bordering the North Sea. The scientists involved were not always interested or engaged in the machinations of international diplomacy but recognized that international conflict could restrict or ruin scientific advancement. Forms of diplomacy and science that operated beyond national borders were necessary in the vast expanses of a depleted ocean that was feeding Europe and providing much needed coastal employment. It was an era (c. 1880s–1920s) that saw changing attitudes to funding international science by reluctant governments, growing international reputations for scientists in diplomatic relations, and an emerging recognition that science diplomacy could act as both a port (site of goodwill) and a storm (site of tension) in the rebuilding of post-war international relations.

Britain's involvement in North Sea fisheries stock management was a delicate balancing act between political reluctance to directly fund "pure science" alongside efforts to construct sites of international science collaboration in the late nineteenth and early twentieth centuries.[89] A significant shift in policy came through scientific advocates in Britain who reframed international science as being of *and* for practical ends. This revised approach presented these international interventions as being beneficial to British interests in industry, commerce, and the marine economy, instead of simply being focussed on science and pure scientific advancement.

Marine scientists were increasingly at the center of international politics, as evidenced by the case of Norwegian explorer-scientist and occasional diplomat Fridtjof Nansen and his less than subtle lobbying of the British Foreign Office on behalf of a nascent Norwegian nation-state. Science diplomacy via scientific collaboration also offered opportunities for reconnection. The exclusion and later re-admittance of Germany from post-war international

89. As this article has shown, the need to involve Europe's major maritime powers in these initiatives was essential to their success and expansion over time.

scientific communities shows the strength and flexibility of scientists to provide a continuation of relations among themselves at times when formal science diplomacy channels were interrupted or indeed suspended.

Any account of marine science in the early twentieth century must pay close attention to the wider context of the period as one of increasing international tensions rather than blossoming internationalism. As Rozwadowski argues, the formation of ICES and its early research achievements bucked the trend of rising nationalism and international tension. However, this was not how marine scientists and engaged politicians envisioned their actions at the time. For marine scientists, the purpose of ICES was practical scientific knowledge, which was framed as being of mutual benefit for all involved. Initially the mission of the Council was not conservation but further development of national industry, an aspect that was a primary draw for government actors. It is necessary to question the extent to which ICES really circumvented tension and ask whether responding to the strain within fishing communities risked maturating into diplomatic incidents.

Participation in ICES was often grounded in the self-interested needs of national capitalism. The development of the fisheries industry and the resultant support of the coastal economy was certainly an objective of a British government that was highly sceptical of centralized science funding. The Scandinavian nations sought to bring together scientists from across several territories, not from a perceived need for greater internationalism but rather a desire to reassert their own position on the international stage that had waned during the nineteenth century. This was due, in part, to the different regard in which scientists were held within these countries.[90] In the case of Norway, this was clearly part of a wider national reawakening that spoke to the nationalism seen elsewhere that had brought about independence from Sweden. Nevertheless, amongst this North Sea community of marine scientists, longstanding bonds were created that were able to withstand and find ways to overcome the challenges of the post-war exclusion of German scientists.

Conflict can be both a driver and destroyer of science diplomacy efforts. In closely analyzing efforts to re-establish ICES research after the conclusion of the First World War, it is clear that simply renewing a research program was *and is* never enough. The first decade of the twentieth century was an era when international science diplomacy was formed and recast as something new by

90. See Jan Eivind Myhre, "Academics as the Ruling Elite in 19th Century Norway," *Historical Social Research* 33, no. 2 (2008): 21–41.

the scientists themselves, who were newly engaged in national and nationalist politics. These scientists created novel institutional structures of international science that came to be the model for science in the twentieth century.

Science diplomacy does not exist in isolation from other forms of diplomacy. It is affected by international trends and sentiments that can, in turn, impact upon more traditional forms of diplomacy. As this article has shown, science diplomacy takes many forms and exists in numerous spaces, both formal and informal. The case of early marine science diplomacy shows that international science, based on collaboration, must be built through trust and mutual necessities. As the recent call in the *ICES Journal of Marine Science* suggests, understanding the past is key for understanding the work of science diplomacy in international arenas.[91] Its major lesson might well be, however, that successful science diplomacy requires flexibility—in terms of procedures, personalities, and plasticity—to cope with rapidly changing contexts, priorities, and egos.

91. Harden-Davies, "The next wave" (ref. 1).