

## Twelve Days in Stockholm, June 1972

Even after the Swedish initiative evolved into an official item on the UN agenda, Sverker Åström and the small circle of diplomats at Sweden's UN mission remained indispensable in leading preparations for the conference. Soon after the adoption of UNGA 2398, Åström communicated to the Foreign Ministry that other UN delegations expected that Sweden would maintain its *de facto* conference leadership position during the preparation process. Swedish officials would continue to play such a role until autumn 1970. In a diplomatic maneuver orchestrated by Åström, Swedish Prime Minister Olof Palme then reached out to his Canadian counterpart Pierre Trudeau for the purpose of recruiting Maurice Strong (Figure 5.1), a former energy company executive and head of the Canadian International Development Agency, to become the conference's secretary general. Strong's eventual appointment filled an increasingly apparent leadership vacuum at the executive level and brought coherence as well as an injection of personal energy and flavor to the preparation process.<sup>1</sup>

Up until the time of Strong's appointment, Sweden's imprint on conference preparations, organizationally as well as scientifically, remained predominant. This was both by design and practical necessity. Exercising the political influence he enjoyed back in Stockholm, Åström in February 1969 convinced the Swedish government to extend an invitation to the United Nations to host the conference, providing him with additional leverage in shaping the agenda at an early stage of the

<sup>1</sup> Åström, *Ögonblick*. Engfeldt, *From Stockholm to Johannesburg*. Wade Rowland, *The Plot to Save the World* (Toronto: Clarke, Irwin & Company, 1973). Canadian Prime Minister Justin Trudeau is the son of Pierre Trudeau.



FIGURE 5.1 The recruitment of Maurice Strong in early 1970 to become Secretary General of the upcoming Stockholm Conference was a diplomatic masterstroke that would help alleviate the emerging North-South tensions that threatened the conference. Strong's personal energy and background as a businessman and head of the Canadian International Development Agency were indispensable in convincing countries of the Global South that the conference would not subordinate their development interests to environmental protection. Twenty years later, Strong would be called upon to serve in the same capacity for the 1992 Rio Earth Summit. Photo: UN Photo/Yutaka Nagata.

preparation period. He demonstrated considerable diplomatic finesse in enrolling other UN delegations in supporting the Swedish-led planning process and orchestrated negotiations surrounding another UNGA resolution, which reaffirmed the aims of the conference and provided greater structure for preparations going forward, including the creation of a twenty-seven-country Preparatory Committee. Åström's persistent engagement brought much-needed coherence to the arrangement of the Committee's critical first gathering in March 1970, which took place amid mounting uncertainty over how conference preparations should proceed.<sup>2</sup>

<sup>2</sup> Engfeldt, *From Stockholm to Johannesburg*.

The first PrepCom meeting, as well as a series of informal consultations orchestrated by Åström in advance, represented an important milestone on the road to Stockholm. The meeting took place several months before Strong signed on as secretary general and can be seen as the climax of the two years of Swedish conference leadership. In his opening statement on March 10, Åström put forward a set of fundamental principles and primary objectives for the conference that could guide the efforts of the Preparatory Committee. These included the crafting of a United Nations Declaration on the Human Environment and the drafting of conventions on particular environmental problems, such as pesticide toxification of ecosystems. They also encompassed the creation of a comprehensive global system for environmental monitoring that would collect scientific data on issues ranging from marine pollution to rising atmospheric CO<sub>2</sub> levels in support of national and international policy action. An overarching principle for the entire conference, according to Åström, was that “action in the environmental field must be seen as an integral part of the whole process of economic and social development everywhere ... to provide people with the kind of environment which is necessary for man’s material prosperity, physical and mental well-being and spiritual life.”<sup>3</sup>

Åström’s statement, as well as documentation on environmental issues circulated in advance of the PrepCom meeting, was drafted by Sweden’s UN mission with substantial support from Swedish scientists – several of whom traveled to New York to help prepare for and take part in the meeting as part of the Swedish delegation. Supporting the efforts of Åström, Engfeldt and Billner, the Swedish science diplomacy contingent included Hans Palmstierna, at that point secretary of the National Environmental Advisory Committee, and Arne Engström, professor of medical biophysics at the Karolinska Institute and secretary of the influential Scientific Advisory Council of the Swedish Government.<sup>4</sup> Palmstierna and Engström were members of a group of hand-picked experts that the Swedish government had established for the purpose of supporting Sweden’s conference preparation efforts. With Engström as chair, the Committee for Research and Factual Issues (*Kommittén for forskning och andra sakfrågor*, CRF) would not only oversee Sweden’s

<sup>3</sup> Statement by Ambassador Sverker Åström, Representative of Sweden, on Tuesday, March 10, 1970. *Preparatory Committee for the United Nations Conference on the Human Environment*, first session, March 10–20, 1970.

<sup>4</sup> United Nations General Assembly, *Report of the Preparatory Committee for the United Nations Conference on the Human Environment*. April 6, 1970. A/CONF.48/PC/6.

scientific output in advance of the conference but also contribute to the preparatory work within the UN Secretariat through diplomatic channels that included a junior member of the Swedish mission who was situated at the center of conference preparations.<sup>5</sup>

Swedish experts had already been providing scientific advice to conference leadership for over a year by the time of the first PrepCom meeting in March 1970. It had become apparent as early as January 1969 that the UN Secretariat and its understaffed Office for Science and Technology lacked the in-house expertise and organizational capacity required to carry out the task of preparing an event on the scale and complexity of the human environment conference. This led to an informal arrangement in which the young diplomat Lars-Göran Engfeldt, who had recently arrived in New York to serve as second secretary at the Swedish UN mission, was discretely attached to the UN Secretariat.<sup>6</sup> Inside the Secretariat, he would serve as a diplomatic advisor as well as a conduit through which experts back in Stockholm could convey much-needed scientific information on the environment to conference planners. Engfeldt's strategic placement would also provide an additional avenue for Swedish influence over the preparatory process.

One direct result of Engfeldt and Åström's sway within the Secretariat was a call for participating countries to produce national environmental reports. Although the conference was conceived as a forum and catalyst for the internationalization of the environment, a primary ambition of the Swedish initiative was to mobilize societies, scientific institutions, and public authorities at the national level. If the conference and its preparations were to only involve UN delegations without deeper domestic engagement in home countries, the Swedes feared that the lasting societal impacts they had envisioned would never come to fruition. They therefore developed a strategy that would promote greater societal participation in conference preparations while also producing a global inventory of environmental knowledge. Operating through the UN Secretariat, Åström and Engfeldt arranged for a circular note to be distributed to member states mandating them to produce national environmental reports and issue-specific case studies as part of their conference preparation efforts.

In the late 1960s, the level of scientific knowledge on environmental issues was relatively poor in many countries, particularly in the

<sup>5</sup> Engfeldt, *From Stockholm to Johannesburg*. Jan Mårtenson. *Att kyssa ett träd: Memoarer [To Kiss a Tree: Memoirs]* (Stockholm: Wahlström & Widstrand, 2000).

<sup>6</sup> Engfeldt, *From Stockholm to Johannesburg*.

developing world. Moreover, links between the government and other societal sectors where research on the environment could take place were tenuous or nonexistent. Hence, in order to stimulate interaction between public authorities and experts from civil society, the Secretariat provided detailed instructions for drafting reports that, by design, compelled governments to coordinate with their national scientific establishments. This unheralded yet significant institution-building aspect of the Swedish initiative resulted in over eighty national reports and a range of environmental case studies that provided an unprecedented overview of the state of the global environment.<sup>7</sup> Preparing Sweden's suite of reports was the primary purpose of the Committee for Research and Factual Issues. The scientific documentation produced under CRF auspices, including three case studies and the national environmental report – the English version of which included summaries in Arabic, Chinese, French, Russian, and Spanish – would also serve as instruments of Swedish science diplomacy. In cooperation with the foreign ministry, the reports were widely distributed through Swedish embassies to be used as templates by developing countries in the drafting of their own national reports. In some cases, Swedish scientists were deployed as informal envoys to advise and assist government officials and local experts in the writing of national reports.

One such science diplomacy mission involved dispatching systems analyst Lars Ingelstam to Brazil in 1970 at a particularly sensitive moment in conference preparations. Scientists at MIT were at the time developing the World Systems computer model that would underpin the Club of Rome's *Limits to Growth* report. Some developing countries, including Brazil, were becoming concerned that environmental protection could entail restrictions on exploiting natural resources and other measures inhibiting economic growth. In this increasingly fraught political context, Ingelstam's dual-purpose assignment was to not only advise on drafting the national report but to also employ his expertise in systems theory to convince outspokenly suspicious Brazilian officials of the merits of the conference and international environmental cooperation on the environment and its compatibility with economic development.<sup>8</sup> Although Brazil continued to criticize the conference, the boycott that some Swedish officials feared did not in the end take place.

<sup>7</sup> Paglia, "The Swedish Initiative." Engfeldt, *From Stockholm to Johannesburg*. McCormick, *Reclaiming Paradise*. Maurice F. Strong, "The Stockholm Conference: Where Science and Politics Meet," *Ambio* 1(1972):3, 73–78. [www.jstor.org/stable/4311954](http://www.jstor.org/stable/4311954).

<sup>8</sup> Paglia, "The Swedish Initiative." Lars Ingelstam, personal communication (Paglia), April 21, 2016.

## SWEDEN'S CASE STUDY ON ACID RAIN

Ingelstam's contribution to Sweden's extensive conference preparation effort also included co-authoring the country's case study on acid rain, an issue that had become a significant concern for Swedish policymakers in the wake of Svante Odén's autumn 1967 exposé and a scientific article he published in 1968.<sup>9</sup> While the majority of the report's eight co-authors were natural scientists, Ingelstam's expertise as an engineer, mathematician, and systems specialist enabled the application of a systems analysis approach to the acid rain problem in what was likely the first environmental study of its kind.<sup>10</sup> The lead author of the case study was CRF member Bert Bolin, who had suggested acid rain, rather than his signature issue of climate change, as the subject of the Swedish study. Bolin's backing of acid rain was based on the recommendation and lobbying efforts of Odén, who pointed to the likely long-term societal costs of acidification and the inevitability that developing countries would also have to confront the issue as they industrialized.<sup>11</sup>

Given the seminal research on atmospheric chemistry that had been conducted at Stockholm University since the 1950s, acid rain was a topic well suited for Bolin's Department of Meteorology. Bringing in colleagues Lennart Granat and Henning Rodhe, who was in the process of completing his dissertation on the long-range transport of sulfur,<sup>12</sup> Bolin led an eight-expert team that also included Odén, Ingelstam, and forest ecologist Carl Olof Tamm in producing a comprehensive case study on the causes, effects, and costs of acid rain.<sup>13</sup> As Bolin's PhD student and in many ways his scientific protégé in the study of biogeochemical cycles and climate change over the course of his long career at Stockholm University, Rodhe played a key role in coordinating the project.<sup>14</sup>

<sup>9</sup> Svante Odén, "The Acidification of Air Precipitation and Its Consequences in the Natural Environment," *Ecological Bulletins* vol. 1 (Stockholm: Swedish Natural Science Research Council, 1968).

<sup>10</sup> Peringe Grennfelt et al., "Acid Rain and Air Pollution: 50 Years of Progress in Environmental Science and Policy," *Ambio* 49(2020): 849–864.

<sup>11</sup> Rothschild, *Poisonous Skies*.

<sup>12</sup> Henning Rodhe, *Long Range Transport through the Atmosphere: A Study of Sulfur as an Air Pollutant* (Stockholm: Stockholm University, 1972).

<sup>13</sup> B. Bolin, L. Granat, L. Ingelstam, M. Johannesson, E. Mattsson, S. Oden, H. Rodhe & C. O. Tamm, *Air Pollution across National Boundaries: The Impact on the Environment of Sulfur in Air and Precipitation. Sweden's Case Study for the United Nations Conference on the Human Environment* (Stockholm: Royal Ministry for Foreign Affairs and Royal Ministry of Agriculture, 1971).

<sup>14</sup> At the beginning of his Ph.D. training, Rodhe also assisted with preparations for the 1967 GARP meeting in Stockholm. By the late 1980s, he would become one of Sweden's

By emphasizing the transboundary nature of the problem, *Air pollution across national boundaries: The impact on the environment of sulfur in air and precipitation* reinforced the political case for international action that Sweden advocated for in the OECD and, later, within the United Nations system.<sup>15</sup> The case study would also serve as an instrument of Sweden's Conference-related science diplomacy. As part of Engfeldt and Åström's efforts to stimulate scientific report writing in developing countries, the Swedish foreign ministry distributed the acid rain study through its embassies around the world. The demonstration of scientific ambition that the Swedish study represented would provide governments, expert agencies, and scientific establishments a template of sorts for their own contributions to the Stockholm Conference.<sup>16</sup> Sweden's acid rain case study would be one of three major reports published in 1971 that were closely linked to Stockholm and the conference preparation process. Each would become a milestone in its respective scientific context and contribute to the formation of knowledge networks and environmental governance institutions in the years following the Stockholm Conference. The three reports would also inform conference participants on emerging scientific issues related to the human environment and contribute directly to key Stockholm outcomes.<sup>17</sup>

SMIC: REPORT FROM AN INFLUENTIAL  
1971 CLIMATE SUMMIT

The report *Inadvertent Climate Modification* was the result of a three-week workshop Study of Man's Impact on Climate, which was held in the summer of 1971 at the Wijk conference center on the island of Lidingö in the Stockholm archipelago.<sup>18</sup> Sponsored by MIT and jointly hosted by the Royal Swedish Academy of Sciences and the Royal Swedish Academy of Engineering Sciences, the SMIC workshop was

leading experts on climate change and was deeply involved with the first three IPCC assessment reports (1990, 1992, and 1992) published during Bolin's chairmanship of the Panel. Henning Rodhe, personal communication, July 24, 2022.

<sup>15</sup> Grennfelt et al., "Acid Rain."

<sup>16</sup> Paglia, "The Swedish Initiative."

<sup>17</sup> Eric Paglia & Sverker Sörlin, "Greening Our Common Fate: Stockholm as a Node of Global Environmental Memory," In: G. Sluga, K. Darian-Smith & M. Herren, eds., *Sites of International Memory: A Century of Commemoration and Internationalization* (Philadelphia, PA: University of Pennsylvania Press, 2023).

<sup>18</sup> Study of Man's Impact on Climate (SMIC). *Inadvertent Climate Modification: Report of the Study of Man's Impact on Climate* (Cambridge, MA: The MIT Press, 1971).



explicitly intended to contribute to conference preparations by assembling many of the world's leading atmospheric experts. Their remit was to reach a consensus and draft a report on the state of the global climate based on the latest scientific knowledge in the field.<sup>19</sup>

The workshop organizer was MIT management professor Carroll Wilson, a senior advisor to Stockholm Conference leadership, who as part of conference preparations had arranged the Study of Critical Environmental Problems workshop the previous summer in Williamstown, Massachusetts. While that workshop attracted mostly American experts and encompassed a range of global-scale environmental issues, SMIC focused exclusively on climate change and was by design highly international.<sup>20</sup> Among the thirty prominent atmospheric scientists from fourteen countries attending the workshop were luminaries like Russian geographer-glaciologist Mikhail Budyko, German climatologist Hermann Flohn, US climate expert William Kellogg, and Princeton climate modeler Syukuro Manabe (a half-century later receiving the 2021 Nobel Prize in physics).<sup>21</sup> Also present was a young Stephen Schneider, who later became a prominent public voice on climate change, serving as rapporteur.<sup>22</sup> All but one participant, the Indian physicist Pisharoth Rama Pisharoty, were from industrialized countries. Curiously, Bert Bolin did not participate in the workshop, and only one Swedish scientist, Erik Eriksson, took part in the role of consultant. Opening with a Sanskrit prayer that asked Mother Earth to forgive human transgressions, the 308-page SMIC report was rapidly published by the MIT Press just a few months after the workshop so it could be widely circulated in advance of the Stockholm Conference.

A draft of the manuscript was delivered to the UN Secretariat by September 1971 in order to influence the third meeting of the conference's Preparatory Committee and was further distributed to selected

<sup>19</sup> David M. Hart & David G. Victor, "Scientific Elites and the Making of US Policy for Climate Change Research, 1957-74," *Social Studies of Science* 23(1993):4, 643-680. [www.jstor.org/stable/285728](http://www.jstor.org/stable/285728).

<sup>20</sup> Spencer R. Weart, "The Evolution of International Cooperation in Climate Science," *Journal of International Organization Studies* 3 (2012):1, 41-59.

<sup>21</sup> Syukuro Manabe & Richard T. Wetherald, "Thermal Equilibrium of the Atmosphere with a Given Distribution of Relative Humidity," *Journal of Atmospheric Science* 24(1967): 241-259. Manabe's work in the 1960s and after was instrumental in the evolution of atmospheric general circulation modeling; see: Paul N. Edwards, "A Brief History of Atmospheric General Circulation Modeling," *International Geophysics* 70(2000): 67-90.

<sup>22</sup> Stephen, Schneider, *Science as a Contact Sport: Inside the Battle to Save Earth's Climate* (Washington, DC: National Geographic, 2009).



scientific organizations, including WMO, ICSU and GARP.<sup>23</sup> The report was structured in such a way as to be of interest both to scientists and relevant officials and institutions, such as national science-funding authorities, international development organizations, and Stockholm Conference delegates, for whom it was considered “required reading.”<sup>24</sup> The first and second sections of the report were pedagogic, providing a lay audience with an overview of the past and possible future of the global climate, including societal impacts and anthropogenic drivers of change. The third and fourth sections were geared toward the scientific community and went into far greater technical detail on the dynamics of the climate system. All sections and subsections included sets of specific recommendations.

Even more important than the scientific aspects of the workshop and report, SMIC represented a turning point in the promotion of climate change as an issue of global political relevance. It also served as a social bonding opportunity that strengthened the growing international network of climate experts,<sup>25</sup> which would in the years ahead play an increasingly decisive agenda-setting role in the realm of climate politics. From a practical scientific standpoint, a key SMIC objective of greatly expanding data collection capabilities was realized a year later with recommendation 79 of the Stockholm Conference Action Plan, which called for the creation of a global climate monitoring network.<sup>26</sup> The latter reflected converging interests between communities of atmospheric and biological scientists that skillfully leveraged the Stockholm Conference to attract new resources and expand their respective research infrastructures.

#### SCOPE I: SEMINAL REPORT ON GLOBAL ENVIRONMENTAL MONITORING

While the SMIC participants were on Lidingö discussing mankind’s impact on climate and the potential consequences for the human environment, members of another international scientific network spent the

<sup>23</sup> SMIC, *Inadvertent Climate Modification*.

<sup>24</sup> Spencer Weart, *The Discovery of Global Warming* (Cambridge, MA: Harvard University Press, 2008).

<sup>25</sup> Paul N. Edwards, *A Vast Machine: Computer Models, Climate Data, and the Politics of Global Warming* (Cambridge, MA: MIT Press, 2010). Paul Edwards & Myanna Lahsen, “Climate Science and Politics in the United States,” Unpublished manuscript (1999). <http://pne.people.si.umich.edu/PDF/PMNPC/USA.pdf> (accessed July 18, 2024).

<sup>26</sup> Edwards, *A Vast Machine*.

summer of 1971 in Stockholm drafting a report advocating the establishment of a Global Environmental Monitoring System (GEMS). It would be the first in a long series of influential reports published by SCOPE, the Scientific Committee on Problems of the Environment, an organization founded by ICSU in 1969 for the purpose of producing interdisciplinary scientific assessments on complex issues at the intersection of environment and society. The series of numbered SCOPE reports would run for almost five decades, involving hundreds of natural and social scientists writing on a broad range of environmental issues. Many of the widely distributed volumes would influence governance initiatives and research trajectories within and across a range of scientific disciplines.

Among the founders of SCOPE was Bengt Lundholm,<sup>27</sup> secretary of the Ecological Research Committee at Sweden's Natural Science Research Council and a member of the Committee for Research and Factual Issues that would oversee the Swedish scientific reports for the Stockholm Conference. He was an early critic of the use of biocides and a strong promoter of ecology as a field of knowledge that in his view ought to influence policy in Sweden,<sup>28</sup> where, like in other industrialized countries in the 1960s and 1970s, many prominent environmental activists were ecologists or biologists.<sup>29</sup> Lundholm's outlook on the policy relevance of ecology also extended to his work with international development. With financial support from the Swedish International Development Agency, Lundholm and the Ecological Research Committee hosted the international symposium "Ecology and the Less Developed Countries" in April 1971 during the lead-up to the Stockholm Conference. The symposium featured papers – published in an issue of the Ecological Research Committee's *Ecological Bulletins* – by experts that, like Lundholm, straddled the realms of science and policy. Participants, primarily from the Global North, included James Lee, the first environmental advisor at the World Bank; Lee Talbot, an ecologist, senior official in several US presidential administrations, and architect of

<sup>27</sup> Gilbert F. White, "SCOPE: The First Sixteen Years," *Environmental Conservation* 14(1987):1, 7–13.

<sup>28</sup> Lundholm edited the volume *Därför ekologi: Vetenskapen om vår överlevnad* [Therefore Ecology: The Science of Our Survival] (Stockholm: Askild & Kärnekull, 1971), with a foreword by former Swedish prime minister Tage Erlander.

<sup>29</sup> Thomas Söderqvist, *The Ecologists: From Merry Naturalists to Saviours of the Nation: A Sociologically Informed Narrative Survey of the Ecologization of Sweden 1895–1975* (Stockholm: Almqvist & Wiksell, 1986). Anna Kaijser & David Larsson Heidenblad, "Young Activists in Muddy Boots: Fältbiologerna and the Ecological Turn in Sweden, 1959–1974," *Scandinavian Journal of History* 43(2018):3, 301–323.

major environmental legislation like the Endangered Species Act; Dale Jenkins, director of the ecology program at the Smithsonian Institution; and Anders Forsse, a career civil servant who from the mid-1960s to the mid-1980s was one of the most influential figures in shaping Swedish development policy. Lundholm himself contributed papers on environmental monitoring and “the DDT Dilemma.”<sup>30</sup>

As a highly active science administrator with a PhD in zoology and a zeal for international cooperation, Lundholm had also been deeply engaged with the International Biological Program (IBP), where he had since 1968 promoted the idea of a Global Network of Environmental Monitoring (GNEM). Lundholm’s intellectual and organizational leadership of international efforts to institutionalize environmental monitoring would result in a major report and, in the wake of the Stockholm Conference, a widely dispersed monitoring network managed by the United Nations’ new environment program. On his initiative, Sweden’s Ecological Research Committee hosted a series of GNEM planning meetings in Stockholm, with Lundholm chairing a team of Swedish natural scientists, including Erik Eriksson, that proposed an international monitoring network of “Global Baseline Stations.”<sup>31</sup> The founding of SCOPE and the approach of the Stockholm Conference provided Lundholm and like-minded scientific elites with a platform and political context for further advancing the idea of an environmental monitoring network.<sup>32</sup> An initiative to this end was supported by the conference’s Secretary General Maurice Strong, upon whose request a SCOPE report on environmental monitoring was produced,<sup>33</sup> with work being initiated in Stockholm in March 1971.<sup>34</sup>

Lundholm served as chairman of the Commission on Monitoring, a body that had been effectively transferred to SCOPE from the IBP. He led a trio of scientists that also included Swedish biologist Sören Svensson and Welsh ecologist Gordon Goodman – another SCOPE

<sup>30</sup> “Ecology and the Less Developed Countries,” *Bulletins from the Ecological Research Committee/NFR* Issue 13 (Stockholm, 1971).

<sup>31</sup> Elena Aronova, “Environmental Monitoring in the Making: From Surveying Nature’s Resources to Monitoring Nature’s Change,” *Historical Social Research* 40(2015):2, 222–245.

<sup>32</sup> Selcer, *The Postwar Origins*.

<sup>33</sup> Bengt Lundholm, “Remote Sensing and International Affairs,” *Ambio* 1(1972):5, 166–173. [www.jstor.org/stable/4311974](http://www.jstor.org/stable/4311974).

<sup>34</sup> Enora Javaudin, “Environmental Problem-Solvers?: Scientists and the Stockholm Conference,” In: Wolfram Kaiser & Jan-Henrik Meyer, eds., *International Organizations and Environmental Protection: Conservatoin and Globalization in the Twentieth Century* (New York: Berghahn Books, 2017), 74–102.

architect who would several years later relocate to Stockholm to become founding director of the Beijer Institute – in drafting the first report in the SCOPE series. The intention behind SCOPE 1, *Global Environmental Monitoring: A Report submitted to the United Nations Conference on the Human Environment, Stockholm 1972*, was to convince conference participants on the merits and feasibility of establishing a widely dispersed network of monitoring stations that could collect and process large quantities of environmental data to facilitate the management of the biosphere. The report, which served as a background paper on environmental monitoring for Stockholm Conference delegates,<sup>35</sup> put forward eighteen detailed recommendations on how such a network could be organized and what specific environmental indicators should be monitored.<sup>36</sup> The essence of the system elaborated in SCOPE 1 would be endorsed in the Stockholm Conference Action Plan and institutionalized as Earthwatch and the Global Environmental Monitoring System within the United Nations Environment Programme.<sup>37</sup> Earthwatch, formally established at the first UNEP Governing Council meeting in 1973, functioned as a catalyst and clearing house for environmental data in support of policy formation, although the system proved difficult to maintain over time for financial, technical, and political reasons.<sup>38</sup> Overall, twenty three of the Stockholm Action Plan's 109 recommendations involved environmental monitoring.<sup>39</sup>

#### TWELVE DAYS IN STOCKHOLM: THE UNITED NATIONS CONFERENCE ON THE HUMAN ENVIRONMENT

Less detailed yet more influential than the Action Plan in articulating a normative outlook on the human environment and establishing a basis for international environmental law, the Declaration of the United Nations Conference on the Human Environment was the other landmark document adopted at the 1972 Stockholm Conference. An intergovernmental

<sup>35</sup> C. C. Wallén, "History of 'Earthwatch' 1972–1995" (1997), available at: <http://yabaha.net/dahl/earthw/History.htm> (accessed April 29, 2022).

<sup>36</sup> Commission on Monitoring of the Scientific Committee on Problems of the Environment (SCOPE) of the International Council of Scientific Unions (ICSU). *Global Environmental Monitoring: A Report Submitted to the United Nations Conference on the Human Environment, Stockholm 1972* (Stockholm: ICSU and SCOPE, 1971).

<sup>37</sup> Aronova, "Environmental Monitoring."

<sup>38</sup> Maria Ivanova, *The Untold Story of the World's Leading Environmental Institution: UNEP at Fifty* (Cambridge, MA: The MIT Press, 2021).

<sup>39</sup> Lundholm, "Remote Sensing."

working group began drafting the eventual Stockholm Declaration in May 1971 and had essentially reached a consensus on its main messages by early 1972. At the start of the Conference in June that year, however, objections by the People's Republic of China – which had recently replaced Taiwan in representing China in the United Nations – complicated the Declaration's adoption by demanding that certain aspects, specifically wording on population and weapons of mass destruction, be modified or removed.<sup>40</sup> With Swedish legal expert and future foreign minister Hans Blix playing a leading role, and with strong engagement from Conference president Ingemund Bengtsson and secretary general Maurice Strong,<sup>41</sup> intensive discussions and drawn-out drafting work continued until the final hours of the Conference on June 16, when a version of the text was ultimately adopted by acclamation, with the nonparticipation of China.<sup>42</sup> In its final form, officially adopted on December 15 by the UN General Assembly, the Stockholm Declaration consisted of a preamble outlining both the importance of environmental protection and the imperative of economic development and a set of twenty-six principles encompassing related aspects ranging from intergenerational equity and environmental education to pollution prevention and the rational use of natural resources. Most significantly, Principle 21 consolidated the idea of environmental harm prevention across national borders – a key legal concept – that would be reiterated twenty years later as Principle 2 of the 1992 Rio Declaration. Throughout, the Stockholm Declaration emphasized, even elevated above environmental concerns, the priority of development and the sovereignty of states, particularly over the exploitation of natural resources.

The Conference had begun on June 5 amid great expectations on the part of the over 1,200 delegates from 113 countries, the thousands of environmental and other activists, and the large media contingent that had descended upon Stockholm for the first-ever United Nations conference of its kind. Notably absent were government representatives of the Soviet Union and most of the Eastern Bloc countries, which had boycotted the Conference over a dispute in the UN over the participation

<sup>40</sup> Hans Blix, "History of the Stockholm Declaration," In: Myron H. Nordquist, John Norton Moore & Said Mahmoudi, eds., *The Stockholm Declaration and Law of the Marine Environment* (Leiden: Brill Nijhoff, 2003), 15–24. Louis B. Sohn, "The Stockholm Declaration on the Human Environment," *The Harvard International Law Journal* 14(1973):3, 423–515.

<sup>41</sup> Peter Stone, *Did We Save the Earth at Stockholm?: The People and Politics in the Conference on the Human Environment* (London: Earth Island, 1973).

<sup>42</sup> McCormick, *Reclaiming Paradise*; Engfeldt, *From Stockholm to Johannesburg*; Blix, "History."

of East Germany. Yet the potential boycott by states of the Global South that had concerned conference planners did not in the end take place. This was largely due to the painstaking preparation process and the shuttle diplomacy of Maurice Strong, which had to some extent assuaged, although certainly did not dispel,<sup>43</sup> the grievances and suspicions of developing countries surrounding the specter of the environment being used as a pretense for imposing limits to economic development. Conference preparations included distilling some 700 pages of official documentation from hundreds of scientific reports drafted by UN member states and international organizations. Four two-week meetings were held between March 1970 and March 1972 of the twenty-seven-country Preparatory Committee, chaired by Jamaican diplomat Keith Johnson. Regional seminars took place in Bangkok, Addis Ababa, Mexico City, and Beirut, and two gatherings of leading development economists at Columbia University in New York in 1970 and in the Swiss resort town of Founex in 1971.<sup>44</sup>

The Founex seminar and the report that resulted from it were watershed moments in the effort to reconcile economic growth with environmental protection.<sup>45</sup> It foreshadowed the idea of sustainable development, which would be articulated some fifteen years later in the Brundtland Report.<sup>46</sup> Along with Maurice Strong, who lobbied developing countries extensively during the lead-up to the Conference, the initiator of both the Columbia and Founex seminars was the British economist Barbara Ward (Lady Jackson), a strong advocate for the development prerogatives of the Global South. Capping off the preparatory process, Ward and French microbiologist and environmental thinker René Dubos were commissioned by Strong to author the Conference's scientific and symbolic centerpiece, *Only One Earth: The Care and Maintenance of a Small Planet*. The report, which Ward

<sup>43</sup> Macekura, *Of Limits and Growth*.

<sup>44</sup> Engfeldt, *From Stockholm to Johannesburg*; Macekura, *Of Limits and Growth*; Rowland, *The Plot to Save the World*.

<sup>45</sup> P. Rambach, "Founex Report on Development and Environment," *International Conciliation* 586(1972): 7–36. Michael W. Manulak, "Developing World Environmental Cooperation: The Founex Seminar and the Stockholm Conference," In: Wolfram Kaiser & Jan-Henrik Meyer, eds., *International Organizations and Environmental Protection: Conservatism and Globalization in the Twentieth Century* (New York: Berghahn Books, 2017), 103–127.

<sup>46</sup> Björn-Ola Linnér & Henrik Selin. "The United Nations Conference on Sustainable Development: Forty Years in the Making," *Environment and Planning C: Government and Policy* 31(2013):6, 971–987.

and Dubos drafted after collecting contributions from a Committee of Corresponding Consultants consisting of 152 experts from fifty-eight countries representing all world regions, provided Stockholm with its slogan and would become the “officially unofficial” Conference bible.<sup>47</sup>

Sweden’s Prime Minister Olof Palme opened the Conference with an internationally broadcast speech at the Stockholm Opera House in which he indicted industrialized countries for the vast majority of environmental degradation to date,<sup>48</sup> and condemned the United States for conducting in Vietnam a campaign of what he called “ecocide,” setting a tone that elicited accolades from developing country delegates.<sup>49</sup> The idea of ecocide, which would decades later inspire the End Ecocide movement founded by Scottish barrister Polly Higgins,<sup>50</sup> became one of the many themes of the Environment Forum, a parallel series of events facilitated by the Swedish government and the Conference’s preparatory committee to provide scientists, environmental NGOs, and others a place to discuss issues related to the human environment.<sup>51</sup> Although separate from official UNCHE proceedings, the at times cacophonous debates and conclusions of the Environment Forum were reported in the *Stockholm Conference Eco*, a newsletter produced by Friends of the Earth and The Ecologist magazine that was distributed to Conference participants.<sup>52</sup>

The other “outer conference” was less connected to the official UN event and encompassed an even wider political agenda that also included indigenous peoples’ rights and opposition to the Vietnam War.<sup>53</sup> The People’s Forum (Folkets Forum) was a gathering of a broad spectrum of radical groups as well as counterculture constellations and celebrities such as Hog Farm, Wavy Gravy, the legendary psychedelic rock band The Grateful Dead, Stuart Brand, publisher of the *Whole Earth Catalogue*, and the somewhat unlikely Walter Hickel, President Nixon’s former Minister of the Interior.<sup>54</sup> Organized by the Swedish

<sup>47</sup> Selcer, *The Postwar Origins*, 201.

<sup>48</sup> Lynton Keith Caldwell, *International Environmental Policy: Emergence and Dimensions* (Durham & London: Duke University Press, 1990).

<sup>49</sup> Selcer, *The Postwar Origins*.

<sup>50</sup> Polly Higgins, *Eradicating Ecocide: Laws and Governance to Prevent the Destruction of Our Planet* (London: Shephard-Walwyn, 2010).

<sup>51</sup> Stone, *Did We Save the Earth*; Caldwell, *International Environmental Policy*.

<sup>52</sup> McCormick, *Reclaiming Paradise*.

<sup>53</sup> Rowland, *The Plot to Save the World*.

<sup>54</sup> Leonidas Aretakis, *Extas i folkhemmet: Sveriges psykedeliska historia* [Ecstasy in the People’s Home: Sweden’s Psychedelic History] (Stockholm: Natur & Kultur, 2022), 425–427 (e-book pagination).



leftist organization Powwow,<sup>55</sup> “Woodstockholm,” as some called it, was safely sequestered far away from the main Conference on the outskirts of the city at an abandoned airfield in Skarpnäck, where Swedish authorities had set up a tent city for the several thousand young activists that had traveled to Stockholm to protest or raise awareness for their particular cause and, as it were, consume large amounts of narcotics.<sup>56</sup> In the rather more posh setting of the Grand Ballroom of Stockholm’s Grand Hotel, the International Institute of Environmental Affairs and the International Population Institute arranged a well-attended Distinguished Lecture Series for Conference delegates that featured talks by Club of Rome founder Aurelio Peccei, Swedish Nobel Prize-winning economist Gunnar Myrdal,<sup>57</sup> former science advisor to the British government Sir Solly Zuckerman, and Norwegian explorer and ethnographer Thor Heyerdahl, as well as lectures by René Dubos and Barbara Ward (Figure 5.2).<sup>58</sup> The *Only One Earth* authors, along with other Environment Forum intellectuals such as Egyptian ecologist Mohamed Kassas, American anthropologist Margaret Mead (Figure 5.2), and MIT professor Carroll Wilson, also participated in a big picture brainstorming event under the banner of “Where do we go from now” arranged by Olof Palme and Maurice Strong at the Swedish prime minister’s retreat at Harpsund halfway through the conference.<sup>59</sup>

In one of her many contributions to the success of Stockholm, Barbara Ward, together with Margaret Mead (Figure 5.2), served as a liaison between the Environment Forum and the Conference plenary, providing a voice for the over 400 NGOs present in Stockholm.<sup>60</sup> Although there was a degree of overlap between topics addressed at UNCHE and the various side events of the “Stockholm circus,”<sup>61</sup> the Environment Forum

<sup>55</sup> McCormick, *Reclaiming Paradise*.

<sup>56</sup> Aretakis, *Extas*.

<sup>57</sup> Myrdal was co-recipient together with Friedrich Hayek of the 1974 Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel. His June 8, 1972 lecture during the Stockholm Conference, “Economics of an Improved Environment” was published, along with other speeches from the Distinguished Lecture Series in Maurice Strong (ed.), *Who Speaks for the Earth?: Seven Citizens of the World on Major Issues of the Global Environment* (New York: W. W. Norton & Company, 1973).

<sup>58</sup> Sidney Hyman, *The Aspen Idea* (Norman: University of Oklahoma Press, 1975). Rowland, *The Plot to Save the World*.

<sup>59</sup> Javaudin (2017) and Selcer (2018) devote several pages to this fascinating “backstage” event during the Stockholm Conference.

<sup>60</sup> McCormick, *Reclaiming Paradise*; Caldwell, *International Environmental Policy*; Engfeldt, *From Stockholm to Johannesburg*; Macekura, *Of Limits and Growth*.

<sup>61</sup> Selcer, *The Postwar Origins*.



FIGURE 5.2 Economist, author, and journalist Barbara Ward (left), a globally renowned champion of international development during the 1960s and 1970s, was a moral and intellectual leader of the Stockholm Conference, co-authoring its unofficial report *Only One Earth* and serving as a bridge between various stakeholder groups. Cultural anthropologist Margaret Mead (right) was one of the many prominent participants of the parallel civil society Environment Forum, for which she and Ward functioned as a communication channel with the official conference. Photo: UN Photo/ Yutaka Nagata.

encompassed exhibitions, films, lectures, and discussions on a wide variety of issues, such as workplace environments and supersonic transport, that were not otherwise part of the official Conference agenda.<sup>62</sup> These moreover included complex and controversial questions like limits to economic growth, socioeconomic justice, and the nexus of population, pollution, technology, and natural resources. This sparked heated debates between Paul Ehrlich and Barry Commoner and their respective followers as part of an ongoing feud between the two prominent

<sup>62</sup> Lars Emmelin. "The Stockholm Conferences," *Ambio* 1(1972):4, 135–140. Workplace environment was the topic of one of the reports Sweden submitted for the Conference and was mentioned by Olof Palme in his opening speech. It was also an area of concern and activism for Hans Palmstierna (see Heidenblad 2021). Supersonic travel, which some feared could damage the ozone layer, was a sensitive issue for France and the United Kingdom due to the Concorde program (Engfeldt 2009).

scientist-environmentalists.<sup>63</sup> The large number of activists in Stockholm also made their presence felt through demonstrations in the city center in the vicinity of the three main Conference venues of Folkets hus (the People's House), the Old Parliament building, and what was at the time known as the New Parliament building and is today Stockholm's Culture House. Several hundred custom-designed "environment bicycles" were provided by the Swedish organizing committee to facilitate sustainable mobility around downtown Stockholm, along with shuttle bus services and a fleet of UN-blue Volvos and Saabs for Conference delegations.<sup>64</sup>

By the time of the Stockholm Conference, Commoner – an American biologist and author of the bestselling 1971 ecological critique of technology-driven capitalism *The Closing Circle* – had come to consider the environment as "the world's most dangerous political issue" due to the substantial North-South divisions that had surfaced during the four years of preparations.<sup>65</sup> Despite the acrimony of the months leading up to the Conference, and the eventual Eastern Bloc boycott, the twelve days in Stockholm, abetted by a stretch of superb early-summer weather and a great deal of popular interest from around the world, went exceptionally well. There was no major controversy, aside from some of the theatrics of the outer conferences and the drama surrounding the redrafting and adoption of the Stockholm Declaration. The celebrated high point came toward the end, in a speech that encapsulated the tensions and tradeoffs at the core of the Conference. India's Prime Minister Indira Gandhi (Figure 5.3), the only foreign head of state present in Stockholm, embodied the concerns of developing countries. In her landmark address before a June 14 plenary session at Folkets Hus, Gandhi articulated the essential – some would argue ostensible – contradiction between environment and development at the heart of the human environment concept:

On the one hand, the rich look askance at our continuing poverty – on the other, they warn us against their own methods. We do not wish to impoverish the environment any further and yet we cannot for a moment forget the grim poverty of large numbers of people. Are not poverty and need the greatest polluters?

<sup>63</sup> Andrew Feenberg, "The Commoner-Ehrlich Debate: Environmentalism and the Politics of Survival," In: David Macauley, ed., *Minding Nature: The Philosophers of Ecology* (New York: Guilford Press, 1996).

<sup>64</sup> Stone, *Did We Save the Earth*. Mårtenson, *Att kyssa ett träd*.

<sup>65</sup> Barry Commoner, *The Closing Circle: Nature, Man, and Technology* (New York: Random House, 1971). Barry Commoner, "Motherhood in Stockholm," *Harper's*, June (1972), 49–54. Macekura (2015) employs Commoner's formulation as the title for his chapter on the Stockholm Conference.



FIGURE 5.3 India's Prime Minister Indira Gandhi delivering the most celebrated speech of the Stockholm Conference in which she eloquently articulated the concerns of the Global South on the issue of the human environment and its implications for development. Photo: UN Photo/ Yutaka Nagata.

The successful conclusion of the Conference with the adoption of the Stockholm Declaration on June 16 was reaffirmed six months later at the UN General Assembly in New York with Resolution 2997 of December 15, 1972, which formally established the United Nations Environment Programme and thus secured the long-term institutional legacy of Stockholm and its extensive preparation period. The resolution mandated a developing country majority in the UNEP Governing Council, consisting of sixteen seats for countries of Africa, thirteen for Asia, six for Eastern Europe, ten for Latin America, and thirteen for Western Europe and other states. Maurice Strong was appointed as the founding Executive Director of UNEP, which, in line with developing country demands,<sup>66</sup> and through skillful diplomatic maneuvering by Kenya's UN delegation, would be based in the Global South.<sup>67</sup> At a meeting of the Second Committee of the UN General Assembly in November 1972, the Kenyan capital of Nairobi was selected to host UNEP, rather

<sup>66</sup> Stone, *Did We Save the Earth*.

<sup>67</sup> Ivanova, *The Untold Story*.

than the established UN centers of Geneva or New York, the US preference of Vienna,<sup>68</sup> or even Stockholm, as some had suggested during the Conference.<sup>69</sup> Stockholm thus signaled not only the arrival of the environment on the international political agenda but also a relative increase in the prestige and influence of developing countries within the UN system. Yet the Stockholm Conference, and its ambitious Action Plan and precedent-setting Declaration, decidedly did not resolve the conflicts and complexities inherent in the world's most dangerous political issue. The several years leading up to June 1972 would, as Commoner perhaps feared, rather come to represent the onset of a polarization in global environmental diplomacy that has endured for half a century. As the world wrestled with the environment-development dilemma over the course of the 1970s and after, including developing country calls for a New International Economic Order,<sup>70</sup> and Strong set about establishing the secretariat for the first UN body situated in the Southern Hemisphere,<sup>71</sup> back in Stockholm, the concept of the human environment would serve as a catalyst. It helped bring about the creation of an international institute for environment and development and a new scholarly platform for the interaction of science and politics, while the convening power of the Swedish capital would continue to play a key role in advancing the organization of climate science.

AMBIO, THE ACADEMY OF SCIENCES,  
AND THE ENVIRONMENT

Not entirely content with the techniques that would be employed in implementing the Action Plan's recommendations, Bengt Lundholm, one of the architects of the initiatives that would become Earthwatch and GEMS at UNEP, delivered a keynote address at the October 1972 Eighth Symposium on Remote Sensing of the Environment in Ann Arbor, Michigan. In his address, he strongly advocated the use of satellites and other modern technologies in environmental monitoring. He also argued that the increased use of remote sensing would not only

<sup>68</sup> Macekura, *Of Limits and Growth*.

<sup>69</sup> Mårtenson, *Att kyssa ett träd*. Proposals for London, Madrid, Malta, Mexico City and New Delhi were also made during the Conference (Emmelin 1972).

<sup>70</sup> Linnér and Selin 2013; Carl Marklund, "Double Loyalties?: Small-State Solidarity and the Debates on New International Economic Order in Sweden during the Long 1970s," *Scandinavian Journal of History* 45(2020):3, 384–406.

<sup>71</sup> Macekura, *Of Limits and Growth*.

facilitate the collection of more comprehensive and higher-quality environmental data but that satellites connected to geographically dispersed ground stations would also foster greater international cooperation.<sup>72</sup> Lundholm's idealistic outlook largely reflected a basic conviction that laid behind the Swedish initiative – that the biosphere would benefit from multilateral cooperation and that the human environment could serve as a medium for enhancing international solidarity and strengthening global institutions. Further, Lundholm's call for greater use of remote sensing dovetailed with the Swedish position in the UN Committee on the Peaceful Uses of Outer Space, another emerging area of international cooperation that Sweden had taken part in establishing.<sup>73</sup>

To extend the reach of Lundholm's message, a transcript of his speech, "Remote Sensing and International Affairs," was published in *Ambio – A Journal of the Human Environment* (Figure 5.4). The journal was a new initiative of the Royal Swedish Academy of Sciences, which was in the midst of a modernization effort to make itself more relevant and attuned to the prevailing environmentalist sentiment of the early 1970s.<sup>74</sup> Launched in February 1972 during the lead-up up to Stockholm, *Ambio* would over the course of the year publish interviews and articles by scientists and officials involved with the Conference, including Sverker Åström, Inga Thorsson, Maurice Strong, and Hans Palmstierna. The inaugural issue featured a condensed version of Sweden's acid rain case study,<sup>75</sup> and the lead story of the following issue was in effect an early warning on stratospheric ozone depletion written by the Dutch expatriate Paul Crutzen,<sup>76</sup> at that point a research associate at Stockholm University's Department of Meteorology. Crutzen was soon after appointed to the editorial board of the journal, where he would in 1974 publish another lead article on the deleterious effects of human activity on the ozone layer.<sup>77</sup> *Ambio* embodied the shift at the Academy and other scientific institutions from studying nature to understanding the entangled complexities of the human environment.<sup>78</sup> Aimed

<sup>72</sup> Lundholm, *Remote Sensing*.

<sup>73</sup> "Sweden Urges UN Action on Remote Sensing." *Ambio* 1(1972):5, 175–175. [www.jstor.org/stable/4311976](http://www.jstor.org/stable/4311976).

<sup>74</sup> Sverker Sörlin, "The Environment as Seen through the Life of a Journal: *Ambio* 1972–2022," *Ambio* 50(2021):1, 10–30. <https://doi.org/10.1007/s13280-020-01421-w>

<sup>75</sup> "Sulphur Pollution across National Boundaries," *Ambio* 1(1972):1, 15–20.

<sup>76</sup> Paul Crutzen, "SST's: A Threat to the Earth's Ozone Shield," *Ambio* 1(1972):2, 41–51.

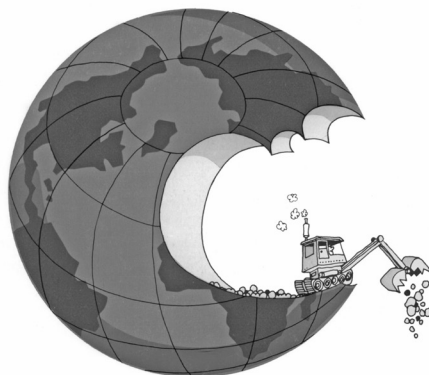
<sup>77</sup> Paul Crutzen, "Estimates of Possible Variations in Total Ozone Due to Natural Causes and Human Activities," *Ambio* 3(1974):6, 201–210.

<sup>78</sup> Sörlin, "The Environment as Seen through the Life of a Journal."



# AMBIO

A JOURNAL OF THE HUMAN ENVIRONMENT  
RESEARCH AND MANAGEMENT



ROYAL SWEDISH ACADEMY OF SCIENCES / UNIVERSITETSFÖRLAGET ■ VOLUME 1 NUMBER 1 1972

FIGURE 5.4 Front cover of the February 1972 inaugural issue of *Ambio – A Journal of the Human Environment*, which over fifty years later continues to be published under the auspices of the Royal Swedish Academy of Sciences as a platform for policy-relevant science. Cover illustration by Nils Petersson. Courtesy of Ambio.

at a broad international audience of scientists, policymakers, and the general public, the varied contributions from Swedish and international experts have encompassed issues of environment, society, politics, economics, law, and technology. It has also served as a forum for the development of concepts and fields of research with close ties to Stockholm, including resilience, ecological economics, Earth system science, and the Anthropocene. The latter was the topic of the most-cited article in the journal's fifty-year history, a 2007 transdisciplinary examination of the Anthropocene concept by Earth system scientists Paul Crutzen and Will Steffen and the environmental historian John McNeill.<sup>79</sup>

Moreover, *Ambio* has since its inception made a point of publishing pieces more reflective in nature. One example is a June 1972 article,

<sup>79</sup> Will Steffen, Paul J. Crutzen & John R. McNeill, "The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature?," *Ambio* 36(2007):8, 614–621.



published in conjunction with the Stockholm Conference, on the professional and ethical responsibilities of scientists in relation to the environment. It was authored by the American nuclear physicist Jack Hollander,<sup>80</sup> who would several years later be appointed as the international chairman of the Academy's newly established Beijer Institute.<sup>81</sup> Over the course of its half-century at the Academy, *Ambio* has also served as a communication platform for policy initiatives, scientific research, and the results of high-level events associated with Stockholm that advanced both environmental and foreign policy imperatives. An early example was a series of *Ambio* Special Reports presenting the scientific papers and policy recommendations of the three installments of the Soviet-Swedish Symposium on the Pollution of the Baltic that were held in Stockholm and Riga in 1971, 1973, and 1975.<sup>82</sup> The meetings were the initiative of the Soviet Academy of Sciences, the Royal Swedish Academy of Engineering Sciences, and the Swedish National Environmental Protection Agency and led to the creation of a Joint Soviet-Swedish Working Group on Problems of the Human Environment. From the second symposium, other states bordering the Baltic Sea also took part. In promoting scientific cooperation and environmental protection across Cold War boundaries, the symposia documented by *Ambio* contributed to the creation of the first Baltic Sea Convention in 1974.<sup>83</sup> This commitment to Baltic Sea science and governance would continue into the 1990s and beyond. In conjunction with the September 1990 Baltic Sea Prime Ministers Conference in Ronneby, *Ambio* would for instance publish a Special Report on the state of the Baltic Sea environment to serve as a scientific point of departure for the discussions held by the heads of government that gathered in the southern Swedish city during the waning days of the Cold War.<sup>84</sup> Initiated

<sup>80</sup> Jack Hollander, "Scientists and the Environment: New Responsibilities," *Ambio* 1(1972):3, 116–119.

<sup>81</sup> In the same issue of *Ambio*, Hans Palmstierna contributed an article on the responsibility of scientists to provide actionable knowledge on the safety of indoor working environments. Hans Palmstierna, "An Open Letter: The Scientist and the Working Man," *Ambio* 1(1972):3, 110–115. [www.jstor.org/stable/4311958](http://www.jstor.org/stable/4311958).

<sup>82</sup> 1st Soviet-Swedish Symposium on the Pollution of the Baltic / 1ый Советско-Шведский Симпозиум по Загрязнению Балтийского Моря. *Ambio Special Report*, no. 1(1972). 2nd Soviet-Swedish Symposium on the Pollution of the Baltic / 2ой Советско-Шведский Симпозиум по Загрязнению Балтийского Моря, *Ambio Special Report*, no. 4 (1976), 3rd Soviet-Swedish Symposium on the Pollution of the Baltic / 3ий Советско-Шведский Симпозиум по Загрязнению Балтийского Моря. *Ambio Special Report*, no. 5(1977).

<sup>83</sup> Norström, Stig, and Стиг Нурстрём. "Preface / Предисловие." *Ambio Special Report* (1976):4, 5–5. [www.jstor.org/stable/25099570](http://www.jstor.org/stable/25099570).

<sup>84</sup> *Ambio*, "Special Report Number 7: Current Status of the Baltic Sea," September 1990.

by Sweden and Poland, the Ronneby Conference was a key moment in enhancing regional cooperation under rapidly changing political circumstances. Taking into account advances in scientific knowledge on transboundary environmental problems, the meeting updated the 1974 Helsinki Convention and resulted in a Baltic Sea Declaration and the Baltic Sea Joint Comprehensive Environmental Programme.<sup>85</sup>

Like with the various Special Reports on environmental concerns related to the Baltic, the editors of *Ambio* have since the early 1970s taken the opportunity of international events in Sweden to assemble thematic issues on some of the most significant issues of the day. In September–October 1973, Stockholm hosted the ten-day United Nations Symposium on Population, Resources and Environment as part of preparations for the UN World Population Conference the following year.<sup>86</sup> The Stockholm symposium attracted world-leading experts such as biologist Paul Ehrlich, physicist John Holdren, and economist Ignacy Sachs and inspired a special issue of *Ambio* on the population question. International contributors to the *Ambio* issue included Barry Commoner, Amory Lovins, and Stephen Schneider, who provided a climate perspective on population, with Swedes such as Inga Thorsson, hydrologist Malin Falkenmark, and plant physiologist Georg Borgström – among the most prominent demographic doomsday prophets of the 1960s – adding articles on the question of population from their own areas of expertise.<sup>87</sup> Borgström’s article addressed the water, land use, and economic challenges of feeding the burgeoning global population by the year 2000.<sup>88</sup> Later in the autumn of 1973, Borgström also participated in another international symposium in Stockholm, for which he contributed a paper on the links between food and energy.<sup>89</sup> Convened by the Royal Swedish Academy of Sciences, the Energy in Society symposium, although planned earlier, coincided with the 1973 oil crisis that thrust energy to the top of the international agenda.

<sup>85</sup> Helsinki Commission, *30 Years of Protecting the Baltic Sea: HELCOM 1974–2004* (Helsinki: Helsinki Commission, 2004). Björn Hassler, “Protecting the Baltic Sea – The Helsinki Convention and National Interests,” In: Olav Schram Stokke & Øystein B. Thommesen, eds., *Yearbook of International Co-operation on Environment and Development (YBICED) 2003/2004* (Oxford: Earthscan, 2004), 33–41.

<sup>86</sup> United Nations, *Report of the Symposium on Population Resources and Environment* (Stockholm, September 26–October 5, 1973). E/CONF.60/CBP/3.

<sup>87</sup> “Population,” *Ambio* 3(1974): 3–4 (special issue).

<sup>88</sup> Georg Borgström, “The Food-Population Dilemma,” *Ambio* 3(1974):3/4, 109–113. [www.jstor.org/stable/4312062](http://www.jstor.org/stable/4312062).

<sup>89</sup> Georg Borgström, “Food, Feed, and Energy,” *Ambio* 2(1973):6, 214–219. [www.jstor.org/stable/4312029](http://www.jstor.org/stable/4312029).

The special issue of *Ambio* based on the symposium's papers and proceedings also featured contributions from scientific pioneers such as ecosystem ecologist Howard T. Odum, who in his theoretically groundbreaking paper modeled interlinkages between energy, ecological, and economic systems,<sup>90</sup> and economist E. F. Schumacher, who had earlier in 1973 published his highly influential book *Small is Beautiful: A Study of Economics as if People Mattered*. In his *Ambio* article, Schumacher elaborated on how both industrialized and developing countries could reduce their dependence on fossil fuels by promoting decentralized energy technologies and pursuing lifestyles that were closer to nature.<sup>91</sup> The lead article of *Ambio*'s Energy in Society special issue was written by its guest editor, Lars Kristoferson, who had also served as secretary for the symposium.<sup>92</sup> A plasma physicist at the Royal Institute of Technology in Stockholm, Kristoferson had previously written extensively on energy and environmental issues and would in the months following the Energy in Society event become closely involved with the establishment of a new institute at the Academy focusing on precisely those topics. His association with what would become the Beijer Institute – the International Institute for Energy, Resources, and the Human Environment – would shape the trajectory of his career as a scientist, administrator, and environmental advocate.<sup>93</sup> During the next fifteen years, he would help build what would prove to be the common ancestor that three of Stockholm's leading sustainable development institutions – Stockholm Environment Institute, the Beijer Institute of Ecological Economics, and the Stockholm Resilience Centre – can directly trace their lineage to.

#### BIRTH OF THE BEIJER INSTITUTE

The series of events that would lead to the founding of the Beijer Institute started several weeks after the Energy in Society symposium was held at the Academy. The impetus came from the Swedish industrialist and financier

<sup>90</sup> Howard T. Odum, "Energy, Ecology, and Economics," *Ambio* 2(1973):6, 220–227. [www.jstor.org/stable/4312030](http://www.jstor.org/stable/4312030). James J. Zucchetto, "Reflections on Howard T. Odum's Paper: Energy, Ecology and Economics, *Ambio* (1973)," *Ecological Modelling* 178(2004):1–2, 195–198. [www.sciencedirect.com/science/article/abs/pii/S0304380003005532](http://www.sciencedirect.com/science/article/abs/pii/S0304380003005532).

<sup>91</sup> Ernst Friedrich Schumacher. "Western Europe's Energy Crisis: A Problem of Life-Styles," *Ambio* 2(1973):6, 228–232. [www.jstor.org/stable/4312031](http://www.jstor.org/stable/4312031).

<sup>92</sup> Lars Kristoferson. "Energy in Society" *Ambio* 2(1973):6, 178–185. [www.jstor.org/stable/4312025](http://www.jstor.org/stable/4312025).

<sup>93</sup> Kristoferson would later in his career become Secretary General of WWF Sweden.

Kjell Beijer, whose fortune was in part linked to investments in the energy sector. Inspired by the 1972 Stockholm Conference, Beijer was interested in providing funding for a new Nobel Prize that would stimulate research in the fields of energy and environment. Through the Nobel Foundation's executive director Stig Ramel, who was a board member of Beijer's investment company, the idea was communicated to Carl Gustaf Bernhard, permanent secretary of the Royal Swedish Academy of Sciences, the body responsible for awarding the Nobel prizes in chemistry and physics as well as the economics prize in the memory of Alfred Nobel. Over the course of several meetings and communications in January 1974, Bernhard was able to convince Beijer that his interest in advancing energy and environmental research would be better served by financing the establishment of a new institute at the Academy dedicated to those domains.<sup>94</sup>

Such an institute was well suited to the Academy's expanding interest in issues of the human environment. In addition to launching *Ambio* in 1972 and convening the Energy in Society symposium in 1973 – as well as other thematic conferences on environment-related issues in the years that followed – the Academy also established an Environment Protection Committee in 1974 in order to shape research policy on natural resources and the environment. The committee, initially chaired by the diplomat and environmental philosopher Rolf Edberg, was not only active nationally but also served as Sweden's representation in the ICSU body SCOPE.<sup>95</sup> Bernhard and a small group of advisors, including Lars Kristoferson, operated through Swedish and international networks during 1974 to determine the optimal organizational structure and specific areas of research that the Beijer Institute would be based upon. One productive forum was a Pugwash meeting in Vienna arranged by the organization's president, Stockholm physicist and Nobel Laureate Hannes Alfvén of the Royal Institute of Technology.<sup>96</sup>

<sup>94</sup> This section draws, among other sources, upon a history of the Beijer Institute by the permanent secretary of the Royal Swedish Academy of Sciences in the 1970s Carl Gustaf Bernhard, *The Beijer Institute: The International Institute for Energy, Resources and the Human Environment* (Stockholm: Royal Swedish Academy of Sciences, 1991), as well as personal communications with Lars Kristoferson and a speech delivered by him at the Gordon Goodman Memorial Seminar on April 29, 2009.

<sup>95</sup> Bosse Sundin, "Environmental Protection and the National Parks," In Tore Frängsmyr (ed.), *Science in Sweden: The Royal Swedish Academy of Sciences 1739–1989* (Canton, MA: Science History Publications, 1989), 199–226.

<sup>96</sup> Bernhard, *The Beijer Institute*. The Pugwash Conferences on Science and World Affairs is an international organization, founded in 1957, that promotes peace and nuclear disarmament. It was awarded the Nobel Peace Prize in 1995. Alfvén founded the Swedish Pugwash chapter in 1964.

Plans for creating the Beijer Institute were formally announced in January 1975, receiving a positive reception from the international scientific press, including the journal *Nature*. To further develop the research and operational agenda of the institute, the Academy in autumn 1975 convened a symposium chaired by Carroll Wilson of MIT, with representatives from a range of international institutes and organizations such as UNEP and the International Institute of Applied Systems Analysis taking part. The symposium's report contributed to the work of the Academy's planning group, which delivered recommendations on the structure, staffing, and other aspects of the institute that were adopted in January 1977. The Beijer Institute would be formally inaugurated later that year, moving into its offices in the new Beijer Foundation-financed wing that was added on to the Academy's existing premises in the Frescati section of the city, adjacent to the campus of Stockholm University.<sup>97</sup>

Gordon Goodman, the Welsh ecologist and energy expert with long-standing ties to Stockholm, was appointed to become the founding director of the institute. The selection would prove to be a resounding success in terms of the Beijer Institute's scientific output, international engagement and expansion, and propensity for attracting funding from a wide range of sources during the twelve years of Goodman's leadership. His appointment would also represent a significant moment in the evolution of global environmental governance. As will be explained in Chapter 6, Goodman and the Beijer Institute would become integral parts of the institutionalization and politicization process that transformed climate change into a major international issue by the end of the 1980s. The network that the institute and its director would operate within had at the time of Beijer's founding been expanding its efforts of coordinating scientific activity for well over a decade. In this context, Goodman and the climate science movement's de facto leader, Bert Bolin, would come to embody Stockholm's decisive contribution to the science diplomacy of climate change.

#### GARP 1974, STOCKHOLM: THE RISE OF CLIMATE MODELING

While the Royal Swedish Academy of Sciences was in the process of deciding the organizational mission of the Beijer Institute in 1974, Bert Bolin was preparing an event that would represent a major step

<sup>97</sup> During the existence of the original Beijer Institute from 1977 to 1989, its full title variously included "the International Institute for Energy, Resources and the Human Environment" and "the International Institute for Energy and Human Ecology."

in structuring and setting the agenda for international climate research. Held in the same conference center as the SMIC workshop three years earlier, the International Study Conference on the Physical Basis of Climate and Climate Modelling brought seventy scientists to Stockholm for two weeks of intensive discussions in July–August 1974. The conference was chaired by Bolin and arranged under the auspices of GARP, the global research program that was established at the 1967 atmospheric study conference in Stockholm. The recently established United Nations Environment Program, which would become a driver of international climate science cooperation leading up to the founding of the IPCC in 1988, co-sponsored the 1974 GARP conference along with WMO and ICSU, which had co-organized the 1967 event.<sup>98</sup>

From a scientific standpoint, the primary difference between the two GARP gatherings was that discussions in 1967 centered on understanding atmospheric fluctuations affecting weather, while the 1974 Conference took the significant step of studying longer-term changes in climate through the expanded use of quantitative data and computer modeling. Bolin elaborated on the enormous benefits of computer modeling as well as satellite monitoring for weather and climate prediction in an *Ambio* article that recapitulated the content and conclusions of the 1974 GARP conference, published months before the actual conference report was released. The popular science article also explained how the climate system functioned, the importance of climate in the development of human civilization, and how climate science – including its technological tools – had evolved over the course of decades. In motivating the expansion of international scientific cooperation and investments in modern monitoring and computational technologies, Bolin noted that despite the advances of recent years, climate remained poorly understood and difficult to predict.<sup>99</sup> The further development of the GARP initiative for the purpose of increasing understanding of the general circulation of the atmosphere and identifying the drivers of climate change – natural and anthropogenic – followed the scientific insights of the 1971 SMIC report as well as recommendation 79(d) of the Stockholm Conference Action

<sup>98</sup> World Meteorological Organization (WMO), International Council of Scientific Unions (ICSU). *The Physical Basis of Climate and Climate Modelling: Report of the International Study Conference in Stockholm, July 29–August 10, 1974, Organised by WMO and ICSU and Supported by UNEP* (Geneva: World Meteorological Organization, International Council of Scientific Unions, 1975).

<sup>99</sup> Bert Bolin, “Modelling the Climate and Its Variations,” *Ambio* 3(1974):5, 180–188. [www.jstor.org/stable/4312077](https://www.jstor.org/stable/4312077).

Plan. Similar to SMIC, the report from the 1974 GARP Conference stressed the importance of national monitoring programs and international scientific collaboration. Moreover, Bolin's foreword to the report called for intergovernmental cooperation to tackle the "global problem" of climate change, suggesting a political component to what had to that point mostly been an international scientific endeavor.<sup>100</sup>

GARP 1974 would structure the ongoing WMO-ICSU cooperation on climate science going forward.<sup>101</sup> The conference also represented the debut of UNEP as a sponsor and catalyst of scientific research on climate change. The continued collaboration of the three international organizations would underpin the further institutionalization and advancement of climate science well into the 1980s, primarily under the banner of the World Climate Programme – the successor to GARP that was established in 1980 after the first World Climate Conference held in Geneva the previous year. What is more, the imprimatur of WMO, ICSU, and UNEP would be strategically employed by entrepreneurial scientists seeking to enhance the political status of climate change, with the involvement of UNEP – a creation of the Stockholm Conference – ensuring that the legacy of 1972 would be carried into the science and politics of climate change for years to come. Bert Bolin and Gordon Goodman, and an array of other actors associated with Stockholm, would make decisive contributions – as much organizational as scientific – during the 1980s, a decade that would see global environmental governance begin to come of age.

<sup>100</sup> WMO and ICSU, 1975.

<sup>101</sup> Eugene W. Bierly, "The World Climate Program: Collaboration and Communication on a Global Scale," *The Annals of the American Academy of Political and Social Science* 495(1988): 106–116. [www.jstor.org/stable/1045877](http://www.jstor.org/stable/1045877).