



# THE ENVIRONMENT

*A History of the Idea*

PAUL WARDE, LIBBY ROBIN,  
AND SVERKER SÖRLIN





# The Environment

# **THE ENVIRONMENT**

## **A History of the Idea**

**Paul Warde, Libby Robin, and Sverker Sörlin**

**JOHNS HOPKINS UNIVERSITY PRESS BALTIMORE**

© 2018 Johns Hopkins University Press  
All rights reserved. Published 2018  
Printed in the United States of America on acid-free paper  
9 8 7 6 5 4 3 2 1

Johns Hopkins University Press  
2715 North Charles Street  
Baltimore, Maryland 21218-4363  
[www.press.jhu.edu](http://www.press.jhu.edu)

Library of Congress Cataloging-in-Publication Data

Names: Warde, Paul, author. | Robin, Libby, 1956–, author. | Sörlin, Sverker, author.  
Title: The environment : a history of the idea / Paul Warde, Libby Robin & Sverker Sörlin.  
Description: Baltimore, Maryland : Johns Hopkins University Press, 2018. | Includes bibliographical references and index.  
Identifiers: LCCN 2018007462 | ISBN 9781421426792 (hardcover) | ISBN 9781421426808 (electronic) | ISBN 142142679X (hardcover) | ISBN 1421426803 (electronic)  
Subjects: LCSH: Environmental sciences—Philosophy. | Human ecology. | Nature—Effect of human beings on. | BISAC: SCIENCE / History. | SCIENCE / Life Sciences / Ecology.  
Classification: LCC GE40 .W37 2018 | DDC 304.2—dc23  
LC record available at <https://lcn.loc.gov/2018007462>

A catalog record for this book is available from the British Library.

*Special discounts are available for bulk purchases of this book. For more information, please contact Special Sales at 410-516-6936 or [specialsales@press.jhu.edu](mailto:specialsales@press.jhu.edu).*

Johns Hopkins University Press uses environmentally friendly book materials, including recycled text paper that is composed of at least 30 percent post-consumer waste, whenever possible.

# Contents

*Acknowledgments*

Prologue

- 1 Road to Survival
- 2 Expertise for the Future
- 3 Resources for Freedom
- 4 Ecology on the March
- 5 Climate Enters the Environment
- 6 “The Earth Is One but the World Is Not”
- 7 Seeking a Safe Future

*Notes*

*Bibliographic Essay*

*Index*

# Acknowledgments

This book was first conceived at the inaugural World Congress of Environmental History in Copenhagen in 2009. We three authors from the United Kingdom, Australia, and Sweden found ourselves talking about the idea of “the environment” and its history. The World Congress revealed that *environmental history* did not mean the same thing in different places. The environmental movement was central to some historical discussions; in others it was nearly absent. In the United States, environmental historians were *historians* whose work mapped the emergence of a social movement (called environmentalism since the 1970s, with various precursors). Elsewhere, environmental history included practitioners from a range of different disciplines: the environmentalism of the recent past was a subject for political science, while geographers and ecologists wrote about physical change over time, and historians wrote about the cultural history of these changes, and sometimes about Big History—the stories of the planet from the big bang to the present.

The scales of environmental history were variable. Yet the idea of “the environment” itself has its own history, which emerged in most Western places in the postwar years, strengthening in the second half of the twentieth century. Led by public scientists, the environment was tied closely to “managing” natural resources and the land. The environment was a global idea, fostered by a universal science and growing in importance at the same time as globalization itself. The environment framed the idea of the global (especially the planetary) as much as the new globalism shaped the interdisciplinary sciences that came to call themselves environmental starting in the early 1960s.

We decided to write a book about this big idea, which by 2009 was already changing shape again with the proposal of a new epoch in Earth’s history, the Anthropocene. This was part of a project called “Expertise for the Future,” where we were especially interested in how discussions about the environment always seemed drawn toward its future fate, and how

particular people had gained authority in those conversations. Our ideas were shaped and tested across a series of workshops held at the University of East Anglia in the United Kingdom, Harvard University, the Australian National University, and the Royal Institute of Technology in Stockholm. We would like to particularly thank all of the participants in those events for their papers, questions, reflections, and discussions that extended well beyond the events themselves. We would also like to thank all of those who helped us organize the meetings.

These represent only a part of our accumulated intellectual debts over a period of nine years. They include, directly and indirectly, the authors of the many books mentioned in the bibliographic essay and notes. We benefited greatly from the many helpful comments on interim presentations from this book at conferences of the American Society of Environmental History, the European Society for Environmental History, and the second World Congress of Environmental History (Guimarães, Portugal, 2014), and in numerous other workshops and meetings. Financial and logistical support has come from the Centre for Environmental History, Australian National University; Center for History and Economics (Cambridge and Harvard); Division of the History of Science, Technology and Environment, Royal Institute of Technology (KTH), Stockholm, including its Environmental Humanities Laboratory; Fenner School of Environment and Society, Australian National University; Harvard University Center for the Environment; School of Social Science at the Institute for Advanced Study, Princeton, New Jersey; Peter Wall Institute for Advanced Studies, University of British Columbia; the IHOPE program (now at Uppsala University); Leverhulme Trust, UK; Rachel Carson Center for Environment and Society, Ludwig-Maximilians-University, Munich; Stockholm Resilience Center at Stockholm University; the University of East Anglia; Riksbankens Jubileumsfond (Stockholm); and Formas—The Swedish Research Council for Environment, Agricultural Sciences, and Spatial Planning. At every step of the way, we have enjoyed the intellectual stimulation and conviviality of the Ely Institute.

All told, our (friendly!) critical commentators over the years have been too many to list here. The few that nonetheless deserve to be mentioned by name are those who used some of their precious time to serve as chairs and commentators at conference panels, or read full chapters for us at their various stages of completion (including when they weren't very complete at



all), or commented on the structure of the project as a whole. These are Alison Bashford, Saul Cunningham, Tom Griffiths, Sabine Höhler, Sheila Jasanoff, Susanna Lidström, Gregg Mitman, Ed Russell, Anna Svensson, Jo Warde, Nina Wormbs, and Graeme Wynn.

# The Environment

# Prologue

The environment is all around us. This book asks the question, Where did it come from?

The environment is under threat as never before. Is it possible, we ask, for the economy to grow without the environment being destroyed? Will our lifestyles end up impoverishing the planet for our children and grandchildren?

Yet if we look back, within the lifetimes of many people alive today, such questions would have made no sense. This was not because we were having no impact on nature, nor because we were unaware of the fact of that impact. What we lacked was an idea: a way of imagining the web of interconnection and consequence of which the natural world is made. Without this, we also lacked a way to describe the scale and scope of human impact upon that world. This idea—a planet-changing idea, because it made the planet visible in a wholly new way—was “the environment.”

This is a book about how the idea of the environment came to be and its consequences. We begin this story in 1948, in the ferment of reconstruction and recrimination, in the hope of new global institutions and the fear of humans’ capacity for almost limitless destruction. It was at this moment that a new idea and a new narrative about the planet-wide impact of people’s behavior emerged. “The environment” provided a concept that linked changes close to home to worldwide pressures. At a time of a new “world-mindedness,” the environment became one of the concerns that nations shared—it was important for the raw resources that could create new peaceful societies. The conservation, restoration, and enhancement of the environment were part of international postwar reconstruction, and the environment shaped how many of the new global institutions developed.

In creating an object of imagination and measurement, it allowed a new kind of question about nature and human responsibilities to be asked. Is the world sick? Is the environment getting worse or better? But the environment changes over time, and so do the ideas about what it is. This

depends on who speaks for the environment. Which people are concerned about it? How do people think about it?

The seven decades that have followed have seen vastly changed ideas about the environment. It has become much more complex. The environment is not just about the land but also the sea and the sky. The great oceans of the world and the Earth's atmosphere are important to life, but they are not the jurisdiction of single nations. The global environment provides habitats for plants and animals, including humans. The rise of megacities has changed the way humans live in the world. In the 1940s, most people lived close to where their food was grown, but now a majority live in cities, often very big cities in rapidly developing places like China and India.

The environment has gone from being the background to the (human) world to being an idea shaped by planetary consciousness. The Earth itself has become a "person," an agent of history. People talk differently about the environment because of this. In 1948 the environment emerged in a human historical context, and its institutions were about management and regulation. In 2018, we have so much more information and data from science, and it is freely available in colorful formats through the internet.

One picture from 1968 stands out as a change-maker: the view of the Earth from space, the blue planet—whole and exceptional in the solar system in being suitable for life. Earth is sometimes called the Goldilocks Planet—not too hot, not too cold, just right. Its exceptionalism calls for a new sort of care on a planetary scale. That people can see the whole planet in a single image has moved the concept of the environment from "international" to "global" and now "planetary." The context for life itself has become both bigger—and smaller. There is only one Earth.

What prompts change in environmental concerns at different times? Sometimes it is a historical moment, a disaster. For example, the accident on April 26, 1986, at Chernobyl nuclear power station in Ukraine heightened concern about how nuclear particles travel on the wind, how they go into the soil and affect food, what they mean for the future health of children growing up, and how the plants and animals that remain have responded to the traces of nuclear explosions in the environment. Each of these questions engaged different experts, people who measured the directions of the prevailing wind, how the nuclear particles were carried in the atmosphere, and how long it took for them to be absorbed. Agricultural



and soil experts measured what might be safe to eat, and health scientists tried to improve the quality of future life for people exposed to the catastrophe. In the decades since, ecologists have measured how wild nature has responded and evolved in an area where people have been excluded. A “new nature” has grown up in this place of catastrophe: it will have a different future because of this moment. For many people ecologists have been the key experts of the environment. Indeed, in some places, people call the environment “the ecology.”

As we trace the environment from 1948 onward in history and into the future, we find different experts are important at different times. Catastrophes have sometimes created the moment for a new expertise, but they are not always emergencies or “instant” disasters like Chernobyl. More often it is “slow catastrophes” that change the environment, working over longer time periods. Droughts and famines, the acidification of the oceans from agricultural chemicals, lead poisoning in children playing in areas with lead paint are all disasters, but they evolve more slowly than the human eye can see. Sometimes we know about the catastrophe only because of technical experts and specialist technologies. The thinning of the ozone layer in the atmosphere, caused by refrigerants called chlorofluorocarbons, is a good example of how expertise can help manage the environment: the ozone layer is “healing” because atmospheric chemists identified what was causing the hole and industry quickly changed the way refrigerators worked, using a different chemical that did not naturally combine with ozone. Generally, however, slow catastrophes are much harder to manage than crises and emergencies. There is more negotiation with more parties over longer times—and we often need many different types of expertise.

In this book, we have started with the postwar moment, when the world needed more food and building materials. Natural resource managers were important, and so were the new international negotiations that included concerns about the environment. Experts gathered around resources, conservation, and climate (see [chapters 3, 4, and 5](#), respectively). The overall story reveals that the environment demanded interdisciplinary and multifaceted knowledge-making and understanding on many scales, as does managing and planning for the future. Yet each area of knowledge that fed into the new idea of the environment had its own history and set of techniques that in turn shaped the new understanding. We introduce them

through important moments when they made a distinct contribution to the idea of environment, and we trace the history and controversies that put them in a position to make that contribution. More and more, the story we present is about the rise and rise of “integrated expertise,” of Earth system science—which treats the Earth as a dynamic system, always in flux—and of Big Science, which joins up many different experts, and of the tools of modeling and measurement enhanced by the digital revolution, which accelerates across the same time span. The environment is about people, too, and how they respond to its changes and challenges, and it is not just experts who care about its future. Questions of justice for humans and for the environment itself are moral and complex.

So this is not so much a book about what the environment *is* as much as it is about what humans have wanted to make of it. It is about the imagination, the history, and the creativity of the experts, as well as their technical and diplomatic skills, and how well ordinary people have understood these and contributed to framing environmental concerns. Expertise has moved popular opinion, business practices, and understandings of the world, but only so far. Expertise has limits in the political world. We all share the environment and have a say in what is possible. Thus, the environment is a key concept: it drives conversations about what it means to be human in the world on many scales. These conversations include what sorts of responsibilities humans take for the results of their actions in the past, present, and future.

# 1

## Road to Survival

### A Fable for Tomorrow

Ask many people old enough to remember the first album of the Beatles and news of the blastoff of Yuri Gagarin what sparked their interest in the environment, and they will answer: Rachel Carson's book *Silent Spring*. "There once was a town in the heart of America," it began. America was perhaps at the peak of its economic might and, for much of the population, its home comforts. A vision of a fabled land, as sweet and harmonious as when first laid out by the doughty pioneers, leapt into the minds of millions as they began to read, perhaps already relaxing into a wistful reverie. But within a page, things began to change in the heartland. People fell sick. Doctors were mystified. Children out playing collapsed and died. And where were the birds? The skies were empty. The skies were silent. Was it witchcraft? Was it some monstrous enemy?

It was not. The creeping death was the product of science. It had been brought about by products designed to keep people healthy and the soil productive. They were made by the chemical industry, but it was ordinary Americans who picked up the products at the store and polluted their land, their wildlife, and their bodies. "The people had done it themselves."

First serialized in the *New Yorker* in June 1962, *Silent Spring* saw a vicious reaction from the chemical industry, which in the end only consolidated Carson's fame, with invitations for TV appearances, to the White House, and to testify before government committees that would affirm her claims. Her work galvanized activism and public policy in many countries. Carson herself would die within two years, at the young age of 56. But her legacy embraced and spanned the planet. Today, when the director of the United States Environmental Protection Agency steps forward to make any major pronouncement, he or she does so in the Rachel Carson Green Room.

*Silent Spring* famously described “the contamination of man’s total environment with . . . substances of incredible potential for harm.” In “the environment,” a word she still felt the need to qualify, Carson found a term that could encompass the astonishing pervasiveness of chemical pollution that she catalogued.<sup>1</sup> She was trained in ecology, “a science teach[ing] us that we have to understand the interaction of all living things in the environment in which we live.” This was her third book; she published two popular works on marine science in the postwar years and before that worked as a research scientist. Yet before alighting upon that so memorable title *Silent Spring*, she had considered using “The Control of Nature” or “Man against the Earth.”<sup>2</sup> Carson considered the specific issues of pesticides to have much wider resonance, which was emblematic of humanity’s more general relationship with nature.

At the same time, it seems as if in the years around 1960 she was still searching for a term that could highlight this relationship for a broader audience. “The environment” perhaps did not yet seem popular enough for a book title.<sup>3</sup> In fact, neither of her early suggested titles—using “control” or “against”—were very good descriptions of what she wrote about, as humans were clearly *not* controlling nature in the way that they might desire, while the risks she described were as much to people as to the Earth. “The environment” would come to signify dangers within us, in the forms of toxins, as much as outside, what we were doing to the planet, and might rebound upon us. Such was Carson’s impact that, for many, her work later seemed almost a foundational moment for the term.

This book is a history of that idea of “the environment.” This was not a new word or a new idea in 1962 by any means. But Carson’s treatment of the idea does exemplify an enormous shift that had taken place in the years before she wrote. For many decades, *environment* had been a word used to describe the *context* or background to the real subject of the story, whatever that might be: a study of a species, a writer, a society, a race. It was shorthand for the set of unique surrounding circumstances, which might prove to be overpowering, serendipitous, exculpating, or promoting of adaptation or balance.<sup>4</sup> Of course, this is still a meaning we understand in the English language today. Things can be explained by “their environment.” But that environment is not the real subject of interest—it is not really a thing at all. Carson, in contrast, wrote about “the environment,” a thing with its own essence that itself became vulnerable, a victim of



circumstances: as Carson put it, a fragile “web of life”<sup>5</sup> subject to contamination and assault, its “integrity” subject to “disturbance,” to becoming “corrupt” and being “engulf[ed].”<sup>6</sup> There had been a shift from a world where “man” was “moulded by the environment” to him being able to “alter the nature of his world.”<sup>7</sup>

Yet this transformation in meaning, and a whole environmental revolution, was not a product of the sixties. It was not a revelation bursting from a generation discovering protest, space travel, and sexual intercourse for the first time (to rehearse some other myths). Nor did the idea of the environment under threat detonate unexpectedly in the assured affluence and confidence of a land halfway—as we now know—through the term of its charismatic and zestful young president, John F. Kennedy. The environment was an idea whose moment came earlier, whose story was first written in an earlier time. In keeping with the foreboding and uncertainty associated with it, we must return to a world trying to put itself back together after a shattering war.

## 1948

January 1, 1948, a Thursday, was mild, wet, and windy in London, a frosty and sunny day in Berlin, and a rainy day with thunderstorms in Washington. In Moscow, it was full winter with a stiff ten degrees below zero. Six months later Berlin would be the hot center of a Cold War between these cities as the blockade and airlift, perhaps the most famous event of that year, began. The first of January was also the day when Britain nationalized its railways, when the first color newsreel was filmed in Pasadena, California, and when the General Agreement on Tariffs and Trade (GATT) became effective, signaling the ambition to build a world of free trade and openness—at least among the twenty-three signatory nations. An old order was dissolving; Sri Lanka and Malaysia expected their independence within weeks. Before the month was out, in the chaos and bloodshed of postpartition India, Mahatma Gandhi would be assassinated.

This was a world in the shadow of past and future wars. In vanquished Germany, starvation was common; looting and despair were still everywhere. The bitter and prolonged winter of 1947 had created fuel and food scarcities across the European continent. For some, the war had not just shown humans at their worst; it had shown them as they really are. In

October, the Soviet Union presented a proposal to the United Nations to ban nuclear weapons. The proposal was rejected, and in late August the following year the Soviet Union detonated its own atomic bomb. Yet the natural world still offered some respite. George Orwell, amid the bomb sites and ration cards of postwar London, wrote how “the atom bombs are piling up in the factories, the police are prowling through the cities, the lies are streaming from loudspeakers, but the earth is still going around the sun, and neither the dictators nor the bureaucrats, deeply as they disapprove of the process, are able to prevent it.” In 1948 he retreated to the solace of a cottage on the Scottish island of Jura, writing a book with the year’s numbers in reverse in the title, *Nineteen Eighty-Four*.

Yet all was not well with nature. Shadows of another kind loomed ahead. They were modestly signposted in a book that appeared first in April in the United States and in June in England: *Road to Survival* by William Vogt.<sup>8</sup> This road was not the path of escape from the aggressions of the Axis powers or the pressures of metropolitan life. It was a different, daunting trail, a way to be chosen or not by everyone on the planet because everyone would have to walk it. “By excessive breeding and abuse of the land mankind has backed itself into an ecological trap,” Vogt thundered. The present state of the world portended an existential threat, a trajectory much more all-encompassing than that offered by atomic weapons (as yet owned only by the United States). To write about the changes occurring to nature in 1948 was already to produce “A History of Our Future,” as the final chapter of Vogt’s book was named, an experience totally new to humanity.

*Road to Survival* presented a new history of the planet precisely because it was about the planet as a whole, and all the varied peoples that lived on it. It was a story of global interconnections, unmistakable since the war and its aftermath, but a story of ecological rather than political and military destruction. “An eroding hillside in Mexico or Yugoslavia,” Vogt wrote, “affects the living standard and probability of survival of the American people. . . . We form an earth-company, and the lot of the Indiana farmer can no longer be isolated from that of the Bantu.”<sup>9</sup> This was a new narrative about our planet; not of dreams of wealth, or ideological rifts, but about the very Earth that ailed beneath our feet. As Vogt declared in the preface to the English edition, “The world is sick.”

Vogt presented the curve of the world’s population, already rising steeply for some fifty years, and contrasted it with a graph of natural resources.

These included topsoil, forests, water, grasslands, and “the biophysical web that holds them together.” This curve of resources had been decreasing since industrialization, but now “it is plunging downward like a rapid.” For Vogt, these two curves encapsulated the essence of his message and the fate of the world: they had crossed and were now drawing apart. If that gap could not be closed, “we may as well give up all hope of continuing civilized life. . . . Like Gadarene swine, we shall rush down a war-torn slope to a barbarian existence in the blackened rubble.”<sup>10</sup>

Vogt did not come from nowhere. Trained in ecology at St. Stephen’s (now Bard) College on the Hudson River in New York State, he was a dedicated ornithologist and a lifelong nature protectionist. He brought a scientific background to his cause, but also the practical skills of a negotiator. Yet like the later *Silent Spring*, *Road to Survival* was no scientific textbook: it was a book of passion and of outcry. It was written to *move* readers, not merely tell them things. The world of *Road to Survival* was one suffering the disease of overpopulation. Its symptoms were degraded soils, resource depletion, food scarcity, starvation, famine, and disease, all of which had accelerated during the recently ended war. The world in 1948 was being overwhelmed by modernity, by a humanity that had failed to set limits to what the human enterprise could achieve. Vogt, as much as any American on the threshold of the Cold War, was strongly anti-Soviet. But he was also deeply distrustful of capitalism.

*Road to Survival* quickly became an international bestseller, translated into nine languages and popularized by *Reader’s Digest*. The book reached an estimated thirty million readers. Vogt became a well-known voice for population control, was appointed national director of the Planned Parenthood Federation of America from 1951 to 1962, and served as a scientific representative to the United Nations. The book was his rallying cry.

Vogt’s writing was also novel in his use of the term *the environment*. In his thinking, *environment* ceased to mean context, just the local surroundings of an individual organism. Rather, in his mind, the environment became a global object. Indeed, it would come to embody the global in our minds, especially after that image of our planet, a shimmering blue-green orb in the darkness, became fixed by pictures taken by from the Apollo missions. This global object had a fundamental unity, and a single destiny. Would that spell doom or survival? Vogt wrote, “we live in one

world in an ecological—an environmental—sense.”<sup>11</sup> In this there was also a tacit priority: “environmental” concerns were the top value, the preeminent issue. Population growth was not so much a problem for the populations themselves, or for the nations and their well-being, but it had become a problem for the planet. High birth rates were not an issue for the health of mothers, fathers, or children but rather for the wealth and health of bogs, jungles, forests, and rivers.

### The Accidental Revolution of “the Environment”

*Road to Survival* appeared at the beginning of a revolution in thinking. Part of the change was to make the insights of an ecologist political. Vogt’s work privileged the expertise of the ecologist, combining his scientific training with views formed by wide travels and rich experience from fieldwork. He had spent several years in Latin America as chief of the Conservation Section of the Pan American Union, surveying population and resources. He cited examples from El Salvador, Costa Rica, Mexico, Venezuela, and Peru. Part of the power of his argument was to discover the trajectory for a whole planet everywhere, in places that people knew or could imagine. He connected, as we would later say, the local and the global. This was a notion that became embedded in the idea of “the environment” as he used it. There was an environment outside your door, and it was the same environment as the one outside any door on Earth, and what happened to each place had ramifications for all the others. The idea itself *scaled* up and down, it was inside and out, local and global. This was to become one of the key properties of environmental research in the second half of the twentieth century: it worked on many scales. The environment could appear on any level from the life-world of the microscopic organism to the entire world of humans, the Earth, and its atmosphere.

Vogt had corresponded with Aldo Leopold, another ecologist and the doyen of American conservation by the 1940s. *Road to Survival* was emblematic of a crucial generational change in thinking about conservation as a predominately localized issue to one where a planetary environment gathered together all the strings of all the environments that existed, and in turn made each of those—every mountain, wetland, forest, pond, bay, city—a subset of that whole. This thinking was prefigured in the concerns of Leopold, who had wondered if the war had been caused by the same



ecological forces that led to localized extinctions of animals. Leopold died fighting a wildfire in the very month *Road to Survival* appeared, and his classic *Sand County Almanac* was published posthumously the following year. He wrote of a “land ethic,” of the need to extend obligation and responsibility beyond the human realm to the environment. Conservation was an ethical issue; perhaps *the* ethical issue. Leopold declared: “There is as yet no ethic dealing with man’s relation to land and to the animals and plants which grow upon it. Land . . . is still property. The land-relation is still strictly economic, entailing privileges but not obligations.”<sup>12</sup> Vogt also echoed his fellow American ecologist Paul B. Sears, whose focus was soil degradation and “desertification” in the light of the midwestern Dust Bowl of the 1930s.

Ecology was a type of expertise that the world needed, although, Vogt added, it must be assisted by the social sciences, “the radar that can avert disastrous crashes.”<sup>13</sup> This new thinking found voice in 1948, but it was also the product of developments in science and thinking during the interwar years. It had a polymathic style. *Road to Survival* evoked animal ecology, mathematical population models, and studies of soil degradation and bound them all together with prophecy. All the tools and wisdom of many disciplines would need to be brought to bear if we were to salvage the future fate of the world.

In that same year, Fairfield Osborn published the slim volume *Our Plundered Planet*. “The impulse to write this book,” he noted in the introduction, “came towards the end of the Second World War. It seemed to me, during those days, that mankind was involved in *two* major conflicts. . . . This other war is man’s conflict with nature.”<sup>14</sup> This was not a war of conquest but of mutually assured destruction. Osborn was trained as a scientist with a degree from Princeton and an advanced degree in biology from Cambridge University. Son of renowned paleontologist (and racist) Henry Fairfield Osborn, the younger Fairfield worked as a businessman and had taken a strong interest in eugenics before turning his interest to nature conservation issues and especially the management of New York’s zoo. From 1948 to 1961, he was the first president of the Conservation Foundation, an organization he founded with several like-minded colleagues to raise awareness about ecological problems. As with Vogt, his book won him fame and influential posts, including being asked to serve as a governmental advisor.

Of course, the title of *Our Plundered Planet* said it all: people were doing the plundering, and the scale of degradation was global. It was also a vision of the consequences of actions in a world where “each part is dependent upon another, all are related to the movement of the whole.” “Man” had inherited the Earth, but was now wreaking “havoc . . . upon his natural environment.” Osborn went so far as to proclaim that “today one cannot think of man as detached from the environment that he himself has created.” Yet this was not a question of maximizing the efficient extraction of the necessary resources for civilized life. Instead, how humans behaved would determine their chances of survival in an age when humankind was “becoming for the first time a *large-scale geological force*.” “One wonders,” pondered Osborn, “what obligations may accompany this infinite possession.”<sup>15</sup> Those who invoke the term *Anthropocene* in the twenty-first century to draw attention to much the same problem may justly wonder, on reading this, why the arguments of 1948 did not translate into a politics that could answer Osborn’s question before its reformulation, or reinvention, a half-century later.

Why this word *environment*? Vogt and Osborn almost certainly did not anticipate a world of environment ministries and protection agencies, of a United Nations Environment Program. The revolutionary career of this word was entirely an accident. And yet not. For an examination of those influences that shaped Vogt and other contemporaries will show how powerfully they shaped, in turn, our own imaginary of what “the environment” is and who is placed to talk about it, or even govern it. And this history is closely connected with the resonances that particular word had among many people who heard new arguments about the planet and reconfigured their thinking about it. The history of an idea, and particularly the idea of the environment, is also the history of a style of imagination, a history of sciences, and very much a history of politics.

## Four Dimensions of “Environment”

In this book we put forward four dimensions that together shaped the concept of the environment in the postwar era. At first sight, this list may surprise the reader. None of them may seem to be very much about the environment. Yet delve a little further and you’ll find that they have become inescapable parts of how we think about it, almost as if they are hiding in

plain sight. An idea that self-evident turns out to be the result of work, of techniques, and of its history.

The first dimension is future. In his famous though controversial 1959 lecture on “the two cultures,” the Cambridge chemist and novelist C. P. Snow declared that scientists “had the future in their bones.” A profound orientation toward the future, and the possibilities of accurately predicting it, was a major preoccupation of postwar science and politics as capitalism and communism competed to offer a plausible vision of what people could expect next. The environment was an idea that burst into life in a futurological soup, but in this particular case it was framed by a narrative about the planet in which scientists both identified a general and advancing degradation in the world around them and felt it incumbent upon themselves to provide solutions.<sup>16</sup>

Our second dimension—expertise—was a means to try to identify and adjudicate between these possible futures. This was a period when scientific expertise itself was shifting, especially in those areas with environmental interests, as the core skill prized in research leaders became less about fieldwork conducted in particular places, and more about the *processing* of information gathered from multiple places. The new expertise required a capacity to consolidate information into models and data sets at scales beyond anything an individual collector could achieve. Among the latter we include those who could handle or generate “big data” and the new institutions in which they worked, increasingly in tandem with government.

The emergence of this processing expertise worked in a kind of feedback loop with the idea of the environment itself. “Environment” was an “integrating” concept that worked across traditional scientific disciplines and demanded new ways of collecting and handling information. This was part of its power and attraction. This change in expertise must be understood as a *relative* shift, and one that took place at different rates in different disciplines, drawn out over decades, but one that also often altered the primary purpose of fieldwork and measurement. The focus moved away, for example, from searching for species in an ecosystem in order to study them and understand their evolution or function toward treating them as “indicators” of total environmental health, and creating new kinds of scientific controversy over issues such as measurement quality or risk thresholds.

These developments must also change what we might traditionally think of as the history of an idea. When the idea becomes associated with the work of thousands of researchers, with government programs and international diplomacy, the very substance of the idea is stretched and molded by their practices, the conferences and workshops, the diplomatic compromises. We will see this repeatedly in the history of the environment. The long and deep thinking of individuals and their moments of inspiration and articulation remain part of the story, but less so over time. Ideas are not just shaped by lone people or collections of women and men in smoke-filled rooms, but just as much in conference halls and laboratories where people come in serried ranks.

Processing environmental information increasingly became wedded to a set of techniques integrating numbers and using computers. This idea was not just about people and minds, but machines, especially at scales of the environment beyond easy observation (of which an object of study such as the “global climate” is an obvious example). The idea went virtual, and what is thought to be important about it is shaped by the work computers can do. Having the means to do this processing and comprehend the environment as a complex and interconnected web made authoritative expertise more “aggregative,” culminating in the multi-authored mega-reports of international bodies, typically making major claims about the future. In this book we will talk about “aggregated expertise.” We will see environment’s extraordinary elasticity, stretching from Aldo Leopold’s “Land Ethic” to the latest report of the Intergovernmental Panel on Climate Change. Yet over time it became the aggregate of techniques and institutions that shaped the idea more than individuals. This also affected who could speak up for the environment with political effect—and who had power over it.

This leads us to our third dimension: trust in numbers, a phrase borrowed from a work by Theodore Porter on the development of nineteenth-century social science, where he describes how quantification permitted the conceptualization of society as an engineering project and helped make it legible and, above all, predictable.<sup>17</sup> Numbers performed an equivalent function for the environment, sometimes presented in striking graphical illustrations. Were things getting better or worse? Were the graphs going up or down? In turn, over time, this lent a particular prestige to experts in “Big Science” who could generate such numbers, often on a very large scale with



projects such as the International Biological Programme (IBP, 1964–74) or the United States’ National Science Foundation project for Long-Term Ecological Research (LTER, first iteration: 1982–86).<sup>18</sup>

The capacity of numbers to indicate change was their essential contribution to this expertise. The environment as a concept was, after all, born precisely out of the idea that things changed and that the change was caused by humans. Numbers provided a trajectory to this story and permitted apparently more precise readings of the future. Politically, having numbers at hand became an essential underpinning of plausibility and authority in making a case for policies. Although never in truth detached from rhetoric and narrative, numbers nevertheless gave the appearance of objectivity and neutrality; they could be translated between disciplines and were suitable for modeling.

At the same time, the environment was an idea that linked the very local, or even the microscopic, to a planetary whole. Thus the fourth crucial dimension was scale and scalability. Part of the power of the concept of environment was that it was *already* familiar to people who worked on very different scales but who had not imagined all the dimensions it would later achieve. We will see this at the beginning of the popularization of the term in the English language through the writing of English polymath Herbert Spencer, who delivered a heady brew connecting psychology, sociology, ecology, and evolutionary theory in the second half of the nineteenth century. His thinking sought integrated ways of thought that encompassed the workings of the mind and the tiniest species but also society and nature more broadly. This made it a simple matter—we might even say an expectation—to suggest that environmental matters were intimately connected from the smallest scales to the planetary. An argument about the planet had local, microlevel implications. But the reverse might also be true. It helped that by the 1920s and 1930s the concept of environment had been adopted by groups as diverse as scientists working in cellular biology, urban public health professionals, geographers describing the habitat of “nations,” and ecologists analyzing the habits and ranges of species. Now they became integrated, not just in name but also in sometimes employing common statistical techniques that could be used on very different scales (logistic curves, computer modeling). Equally, some of the new phenomena being described in the postwar period, perhaps most notably radiation from atomic bomb detonations, reached over great distances but were manifest in

small, localized, indeed intimate forms: from the nuclear blast on a Pacific atoll to the baby teeth thousands of miles away that contained isotopes from its fallout.<sup>19</sup>

These four dimensions worked in combination, giving a distinctive form to the postwar environmental turn. How that happened was neither intentional nor perhaps predictable. The revolution that ensued was accidental. Thus was created a new and particular environmental expertise, an expertise for the future. And as the natural world became seen as an increasingly integrated and systemized entity, so did those who measured and modeled it come to be seen as, or act as, a “voice of nature” themselves.

## The Future and Its Expertise

By the early 1960s, “the environment” was emerging as a potential area of government policy, although this was not institutionalized until the end of the decade or later. A leading advocate was American urban planner Lynton Caldwell, who published the seminal “Environment: A New Focus for Public Policy?” in September 1963.<sup>20</sup> Caldwell opened the piece with a description of a traffic jam on a Los Angeles freeway: how might one think about this? Different experts thought it represented different kinds of problems, depending on their background. One might consider it as an issue of congestion, another of air pollution, or engineering, municipal government, or finance. The problem was, he argued, that these visions were partial, considering only one aspect of a complex whole.

It may be that our failure to cope adequately with certain large and complex problems of our time is a consequence of failure to see the unifying elements in the complexity. In our characteristic concentration on intensive, specialized analysis of our public problem we may omit so many data from our normal field of vision that the integrating profile does not appear.

The purpose of this article is to ask whether “environment” as a generic concept may enable us to see more clearly an integrating profile of our society.

Caldwell went on to discuss the dilemmas of managing competing interest groups and the practice of trying to place valuations on nature. He noted a particularly problematic aspect of the emerging idea of “the environment,” largely shaped as it was by discussions among scientists trying to bridge traditional gaps in approach:

In shaping our environments, we have seldom foreseen the full consequences of our action. The more remote and complex results of environmental change could not be perceived without the aid of a scientific knowledge and technology that we are still in the process of creating. . . . there appears to be no clear doctrine of public responsibility for the environment as such. It therefore follows that concern for the environment is the business of *almost* no one in our public life.

At roughly the same time, across the Atlantic in Britain, the tireless scientific advisor Solly Zuckerman was trying to prod various scientific disciplines toward increased cooperation, inspired by the example of the International Geophysical Year of 1957, which had successfully encouraged much international collaborative research, particularly on the oceans and polar regions across the icy frontiers of the Cold War. Zuckerman was from South Africa and was a primatologist by training but had established a reputation in government circles in Britain during the war as a pioneer of operational research and military strategy. In 1959 he coined the term *environmental sciences* in a memo and later played a leading role in establishing the United Kingdom's Natural Environment Research Council (NERC) in 1964, its chief means of funding environmental research. In fact, none of the participating scientific disciplines, variously preoccupied with the oceans, land, and atmosphere, had sought to put *environment* into the name of this funding body. But each had rejected alternatives suggested by others, and so *environment* was in fact a compromise: the universal second best. Environmental science was integrated by default but no less influential for that. NERC remains the United Kingdom's "leading public funder of environmental science."<sup>21</sup>

By this time, "environment" may have found a reception among academics, but it was also becoming a *political* concept that both demanded an institutional reconfiguration of how the natural world was studied and understood, and was coming to drive certain policy agendas. By the mid-1960s, the environment was creeping toward the policy mainstream.<sup>22</sup> The year 1970 saw the founding of explicitly environmental ministries in the United Kingdom and France and the Environmental Protection Agency (EPA) in the United States, all demanding environmental experts. Lynton Caldwell had been instrumental in drawing up the remit of the EPA. Many of the fields of action they dealt with were old and familiar: pollution, conservation, deforestation, and public health. Alongside such institutional developments came the rise of the popular social and political movement,

environmentalism. By the 1980s new themes had moved to center stage, such as biodiversity loss (see [chapter 4](#)) and climate change.

The story of the environment we tell is not so much about *whose* idea it was or *where* it was born but *how it was made* and how it historically became the responsibility of certain branches of government, particular kinds of experts, and perhaps society as a whole. By the end of the 1960s, the environment was emerging as a standard national policy area in many places at once. In 1965 the US Environmental Pollution Committee delivered a report to President Lyndon B. Johnson on “Restoring the Quality of Our Environment” (to which we will return) that focused on pollution but also embraced public health, potential ecological effects, impacts on soil and water, and even possible climate change driven by carbon dioxide emissions. That same year, the American Association for the Advancement of Science’s Committee on Science and the Promotion of Human Welfare observed, “The entire planet can now serve as a scientific laboratory.”<sup>23</sup>

Numbers helped: government reports were filled with numbers showing the world was in trouble—as if something so big couldn’t be in trouble all at the same time unless there were numbers to prove it. Indeed, while the identification of environmental problems also opened whole new areas of field research, by 1950 a more general problem in the sciences was becoming a superfluity of data and a lack of the means to easily digest it and make it intelligible. The computer helped fill this essential niche. The analytical possibilities presented by computers offered the opportunity of *simulating* an ecosystem or a climate even when data remained far too scarce to build a rigorously empirical view of global dynamics. Computer-assisted data sets fed demand for better global models, finally building such immense amounts of information that only computers could assemble and analyze them. Carl-Gustaf Rossby was one of the key pioneers leading computerized Numerical Weather Prediction, the first example of which he supervised in Stockholm in 1955 (see [chapter 5](#)). It could be observed of him, possibly as a virtue, that he never made an actual weather observation.<sup>24</sup> His own expertise was largely synthesizing and theoretical, but he was at least as much a master of communication and interaction; he organized skillfully the works of mathematically talented collaborators, such as Jule Charney, who over many years built the computers, assembled the data, and ran the tests with their mathematical skills. The 1950s work of

Yale Mintz at the University of California, Los Angeles (UCLA), to develop an early general circulation model (GCM) of the atmosphere and oceans was characterized in an obituary as “heroic efforts . . . during which he coordinated an army of student helpers and amateur programmers to feed a prodigious amount of data through paper tape.”<sup>25</sup> In the data-rich age, heroism was redefined managerially: it demanded the capacity to endure an extreme level of mind-numbing tedium fiddling about in an office.

Thus the postwar period increasingly saw environmental expertise becoming detached from field or laboratory science, expressed instead in mastery of integrative and comparative techniques. Mathematical techniques and computing rather than biology led this revolution. Inevitably, perhaps, expertise also became aggregative, in that no one person or even institution could easily collect, process, and analyze the range of data required to make observations about the environment as a global whole. This had important consequences. Charismatic leaders did not disappear, but their “genius” was no longer individualistic, as it was in the time of someone like John Tyndall (1820–93), the mid-nineteenth-century Irish scientist who developed theories of atmospheric chemistry and wowed audiences with public performances at the Royal Institution in London and during a lecture tour to the United States. Increasingly, charismatic leadership demanded *representativeness* and consensus. For example, climate scientist James Hansen could claim to be speaking for his whole profession when summoned to US Senate hearings on global warming in the long hot summer of 1988, as fires raged in Yellowstone National Park. Staging and showmanship were marks of authority for both men, but their referent shifted. The new scientific politics related to the increasing presence of experts on consultative committees backed by government funds flowing into research and multiauthored seminal papers in *Nature* or *Science*, laying out how we must understand the way “the planet” is going and with it “humanity.”

The virtue of aggregative expertise, the apogee of which is the Intergovernmental Panel on Climate Change, established in 1988, is the apparent anonymity of its production. The output of thousands of individuals adhering to process becomes the guarantee of its accuracy. In fact, the politically acceptable final output may be an averaged view of a range of scenarios offered by the numerous participants within it, the end results being rather distant from the models or data each of those

individuals use. Personal responsibility for the final output is increasingly murky, as each participant contributes to “the scientific consensus.” The *infrastructure* of prediction (institutions, conferences, computer technology, and the like) becomes crucial to the process yet is exposed to error in any one of many integrated metrics and datasets. Practitioners use code in models whose origins may be quite opaque, relying on “craft skills” in translating observations into numerical data series to fit the model. This “normal” practice of science may appear to laypeople to contradict the virtues of both modeling and aggregative expertise.

All these experts, all these billions of dollars, all these globe-spanning institutions, are a lot of weight for one little word—*environment*—to carry. Yet the curious history we tell here reveals how they were enabled by it and how that word inexorably seems to lead back to these global institutions.

The environmental outlook of 1948 was first and foremost a work of integrative imagination, of combining a set of already-existing issues and problems into new meaningful wholes. Vogt launched what might be called the “modern environmental problem catalogue.” It included, but was not limited to, population growth (by far the number-one issue at the time), water scarcity, soil erosion, overconsumption, overgrazing, overfishing, pests, industrial wastes, the retarding productivity of soils, and species loss. None of these was entirely new, but they were brought together into a quite particular way of perceiving the world, a way of using scientific facts to establish what might be called a “survivalist agenda.” The very word *survival* is important—not only because it appeared in the title of Vogt’s book but also because it evokes a historic moment of survival after the most comprehensive war the world had seen. Survival now came to frame the human predicament itself. It was no longer a matter of the survival of the individual or the nation or a single species or a place of natural beauty—what was arguably at stake was the survival of humanity in its entangled and deep relationship with nature.

“The environment” was a crisis concept, born out of a sense of urgency in dealing with looming challenges of unusual magnitude. But it was also, paradoxically, a concept grounded in the middle of postwar reconstruction, so it was a concept of peacetime. A new era was in the making. The war had been total and global. The new world would also be global, and increasingly postcolonial. In 1948, following the UN’s plan for the partition of Palestine, a broad secessionist movement had already gained momentum



across the European empires, with India, itself partitioned in 1947, as a forerunner. Within little more than a decade most countries of Asia and Africa were independent states. It would also be a fossil-fueled world. Iranian oil fields had been critical during the war. In 1947, the great Saudi oil fields were discovered. Vogt's was a pessimistic message in an age both optimistic and bruised. It was a kind of schizophrenia built into the concept of environment, or survival, parallel to the contemporary message about the virtues and vices of atomic power.

With time, environment absorbed the energies of numerous intellectual and scientific strands in a way that no other concept had the capacity to do. Its predecessors (conservation and preservation) did important groundwork, and its later followers and contenders for conceptual space and influence (sustainability, ecological modernization, ecosystem services, Anthropocene) have made valuable contributions. But none of them has so far proved flexible and malleable enough to productively harbor the many tensions and contradictions that are embedded in the most recent phase of the human-nature relationship.

The environment was nobody's intention. It entered the writings of 1948 almost as a virus, percolating into minutes, agreements, plans, and pamphlets. Nowhere did it appear in a title; nobody called themselves by that name. There were no environmentalists to be found loitering or campaigning, no departments of the environment in government offices, no schools or institutes of the environment in universities or think tanks. The revolution of "the environment"—the *conceptual* revolution, as distinct from the political transformation connected with the environmental social movements and the struggles over environment—was silent, unsought, and largely unheralded. Yet without it, the world would have traveled in other directions. The environment emerged with a new unifying power. It was an idea whose time had come.