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978-0-521-46834-3 - Nature's Economy: A History of Ecological Ideas, Second Edition

Donald Worster

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Preface

IN RECENT YEARS it has become impossible to talk about man's relation to nature without referring to "ecology." This peculiar field of study has been suddenly called on, in a manner unusual even in our science-impressed age, to play a central intellectual role. Such leading scientists in this area as Rachel Carson, Barry Commoner, Eugene Odum, Paul Ehrlich, and others, have become our new delphic voices, writing best sellers, appearing in the media, shaping government policies, even serving as moral touchstones. So influential has their branch of science become that our time might well be called the "Age of Ecology."

To explain why this call has come in the last half of the twentieth century is not my purpose here, though it is, of course, a matter that should receive serious attention, especially from historians familiar with the dynamics of popular social movements. The aim of this book, however, is not so much to account for the appeal of ecology to our own time as to understand what this field of study has been prior to its recent ascent to oracular power.

There are compelling reasons for seeking such a historical perspective. Like a stranger who has just blown into town, ecology seems a presence without a past. Before committing ourselves too firmly to its tutelage, however, we might do some digging into its previous life—not in the expectation of uncovering grisly deeds, but simply that we may know

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our teacher better. In that inquiry we might learn more about the kind of science ecology has been, and also more about those aspects of nature which this science has revealed to us. We might see, too, what ecology has *not* told us about nature. How the living world has been perceived through the aid of the science of ecology is thus the main theme of this study in the history of ideas. This perception, I have maintained, has had significant consequences for man's relation to the natural order and will continue to have ever more.

This account will make clear that ecology, even before it had a name, had a history. The term "ecology" did not appear until 1866, and it took almost another hundred years for it to enter the vernacular. But the *idea* of ecology is much older than the name. Its modern history begins in the eighteenth century, when it emerged as a more comprehensive way of looking at the earth's fabric of life: a point of view that sought to describe all of the living organisms of the earth as an interacting whole, often referred to as the "economy of nature." This phrase gave birth to a rich set of ideas out of which emerged the science of today, and I have made it, therefore, the organizing thread of this book.

On close examination, however, the common point of view suggested by an "economy of nature" fragments into *many* views, sometimes leading in thoroughly incompatible directions. "Nature's economy" has been defined by different people for different reasons in different ways, all of which we must sort through as we come to rely more and more on ecology for guidance in our own time. The study of the earth's household of life has opened not one but many doors. My intention here is to ask: Who opened them? Why? What has been seen? Seeking answers to these questions may better prepare us to choose which doors we will want to open in the future.

The reader should not expect in these chapters a traditional treatise on the history of science. By intention as well as training, I approach my theme as an intellectual historian, curious about the origins of our present ecological ideas, their contents, and their practical effects in the past. From this vantage point I have come to believe that the ideas of science are open to much the same kind of treat-

ment as other ideas, such as theological or political thought. Like all of man's intellectual life, scientific ideas grow out of specific cultural conditions and are validated by personal as well as social needs. They are, in short, more closely interwoven with the general fabric of thought than is commonly supposed. Thus, unlike many traditional historians of science who are convinced of the onward and upward march of "truth" and like to keep this chronicle neatly separate from the rest of cultural history, I have blurred the edges a great deal. In fact, my subject is not simply the growth of a narrowly defined field of science but of the larger penumbra of "ecological thought," which is meant to include the literary, economic, and philosophical connections ecology has made.

Unconventional as it may at first seem, this approach works especially well with the history of ecology. While it may be more nearly true to say of mathematics or thermodynamics that it takes its course apart from prevailing intellectual fashions or economic forces, it would be a false assumption to make about the study of ecology. Perhaps because it is a "social" science, dealing with the interrelationships of living creatures, it has never been far removed from the messy, shifting, hurly-burly world of human values. The historian of this interaction must therefore be alert to much more than who contributed what bits of knowledge to the present state of the science; he must range widely over the intellectual landscape of the past. All the same, I have wanted to mark the main achievements of this science, too, and thereby to give historians of science something of value for their own pursuits.

If I am right about the extent to which scientific ideas are rooted in their cultural subsoil, then it must follow that different cultures can produce different scientific traditions. While this is not perhaps an argument one would want to make universal, it does seem to hold true for ecology. There has been a distinctive Anglo-American tradition in this area—never wholly separate from Continental ideas, never wholly a consensus, but withal a single dialogue carried on in a common tongue. In the emergence of ecological ideas the weight of authority lay originally on the British side of this transatlantic tradition, with the Americans content to

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learn their lessons from such naturalists as William Paley and Charles Darwin. But later that pattern came to be altered, even reversed in some cases; consequently, in the last parts of this book the heavier emphasis is on American leadership.

To be as manageable as possible, this book is organized episodically. I have tried to select and focus on major formative moments in the life history of modern ecology. Each of the book's six parts is about one of those moments, a time when ecological thought underwent a significant transformation. Key figures appear in each part, not as heroic revolutionaries or even as thinkers of great influence in every case, but simply as individuals who participated in those changes and best reveal their meaning to us.

In Part One these representative figures include the parson-naturalist Gilbert White, the great Swedish "man of flowers" Carolus Linnaeus, and a number of others whose ideas helped launch a new science in the eighteenth century. Part Two is devoted to Henry David Thoreau as the chief exponent of what I have called "Romantic ecology"—a cluster of ideas still active today, though perhaps more in the popular understanding of ecology than in the models of most scientists. The mid-nineteenth-century work of Charles Darwin necessarily occupies the pivotal place in the maturing of ecology as a science, and in Part Three I have dwelt at length on both the working out of Darwin's own logic and the philosophical implications of his ecological theories. Part Four brings the narrative into the twentieth century and to America's late frontier regions, where the science of ecology came to have immense public importance. Among the subjects analyzed here are the work of Frederic Clements—his so-called "climax" theory of vegetation—and the major test of that new model in the Dust Bowl disaster of the 1930s. In Part Five, I examine the idea of the ecosystem and its relation to energy physics, along with a rival approach that owed much to the philosophy of Alfred North Whitehead and other modern "organicists"; I also discuss the background of Aldo Leopold's ecology-based land ethic. Finally, in Part Six, the story moves into the post-World War Two period, when ecology became a po-

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litical movement as well as a sophisticated but extraordinarily diverse science, rocked by many theoretical disputes.

These six episodes might be characterized, according to the jargon of scientific history, as “paradigm shifts,” in the course of which an older model of nature is overthrown and a new one takes its place. But it must not be concluded that such shifts wiped out all traces of the old; on the contrary, the present corpus of ecological thought is a conglomeration of all its pasts, like a man who has lived many lives and forgotten none of them. By retracing this intellectual biography we can arrive at a much fuller understanding of how ecology has become what it is, how each of these formative episodes has added to the content—as well as to the ambiguities and contradictions—we find in this science today. Here, then, is what I hope will be the chief contribution of this work: a deeper awareness of the roots of our contemporary perception of nature.

In a work of such broad scope there are bound to be omissions that many readers will regret, both from the perspective of science and that of intellectual history. Though keenly aware of the many blank spots, I can only set forth my long-considered rationale for the shape of this study, its geographical and chronological selectivity, its inclusions and exclusions with respect to specific people discussed, and trust that readers will come to see the appropriateness of my design.

To help readers through the sometimes arcane language of the history of ideas, I have added a glossary of key terms at the end of the book. But philosophical concepts can seldom be neatly pinned down in a paragraph or two; the reader should also be alert to their particular contexts to get their shifting, complicated meanings. The notes and bibliography may serve to guide those who wish to do further reading on a theme or person.