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Review: Fielding Biology

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Landscapes and Labscapes: Exploring the Lab-Field Border in Biology by Robert E. Kohler

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Works like *Mesozoic Birds*, essentially a status report in an active field of inquiry, tend to be fated for quick obsolescence. But the comprehensive surveys and abundant provision of primary evidence should ensure the utility of this reasonably priced volume for a substantial term. Serious students of early birds and closely related theropods would be prudent to include this progress report among their core references.

## HISTORY OF SCIENCE

## Fielding Biology

Vassiliki Betty Smocovitis

In his latest book, Robert E. Kohler examines the boundary between field studies and laboratory research in biology. Kohler, a veteran historian of science at the Department of the History and Sociology of Science at the University of Pennsylvania, has previously explored the development of laboratory sciences such as biochemistry in the United States. *Landscapes and Labs* continues his focus on science as practice by concentrating on the place of scientific activity—this time the field—to discern “what it is like to do field biology in a world of labs and experiment.” Tracing the evolution of the notion of “field” as a place of scientific activity, Kohler argues that it was joined to both the notion and acceptance of “laboratory,” a place of science that began to gain in popularity sometime between 1840 and 1870. Only as laboratories increasingly came to be seen as legitimate locales of scientific knowledge-making did the field emerge as a place of activity, a kind of “not-lab.” Initially, at least, field scientists had to work at making their practices more legitimate by adopting laboratory methods, procedures, and values to field contexts. Kohler delineates these efforts from 1890 to 1950, a period that, he argues, was critical for the transformation of American field biology.

The historical argument and theoretical underpinnings of the book are, however, far more complex than this. No simple history of field biology,

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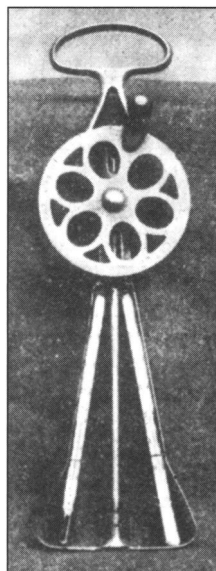
**Landscapes  
and Labs**  
**Exploring the  
Lab-Field Border  
in Biology**

by Robert E. Kohler

University of Chicago  
Press, Chicago, 2002.  
342 pp. \$58, £41. ISBN  
0-226-45009-0. Paper,  
\$22, £15.50. ISBN 0-  
226-45010-4.

Kohler's account concentrates on the historical transformation of the lab-field border and on a set of practices that he refers to as “border biology.” For Kohler, border biology is composed of the set of biological sciences that are associated mostly with the field but do cross into the laboratory zone. He excludes those disciplines that are “exclusively of the field” such as paleontology, paleoecology, and biogeography, as well as others like systematic zoology and botany (which he leaves for another book). He also excludes those laboratory sciences that “deal in some way with field material,” sciences like animal behavior and population genetics. Instead, he focuses on “the subset of field disciplines that lie closest to the laboratory side of the

lab-field border,” namely ecology and evolution, “and that have been most strongly influenced by laboratory culture.” To understand the cultural dynamic between lab and field, he explores at length the notion of “frontier”: borders and boundaries—and their crossings. His analysis draws on a wide-ranging body of literature from the sociology of science and from “frontier history” (including Roman history and Asian history).



**Household technology.** To measure relative humidity in small places, Clements mounted wet and dry thermometers on a 75-cent eggbeater.

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## BOOKS ET AL.

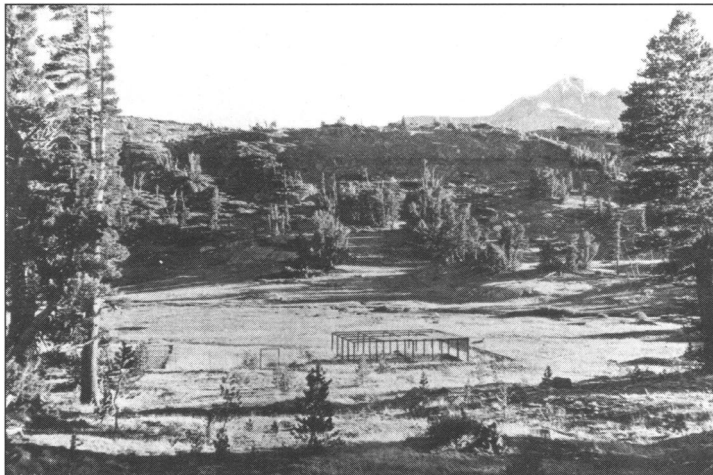
what he terms “border practices” in the work of biologists such as Ernst Mayr, Edgar Anderson, Raymond Lindeman, and Robert Whittaker.

Kohler’s book brings to life some forgotten aspects of the history of American biology. Among these are the importance of institutions like field stations and other, now less popular, facilities for experimental evolution such as biological farms, vivaria, and columbaria. Some of the discussions on instrumentation and procedures offer valuable additions to our understanding of the development of biology in the United States. Especially interesting sections describe the inventiveness of field biologists who fabricated their own tools. For example, to measure relative humidity in dense vegetation and small places, plant ecologist Frederic Clements used a homemade psychrometer that consisted of a wet and dry thermometer mounted on a kitchen eggbeater. The book is replete with marvelous illustrations, photographs, and maps; I especially enjoyed the early images of biologists in the field. Kohler provides abundant nuggets of information and insights (many drawn from environmental history), including the importance of railroads and highways in shaping the course of field sciences in America. It is also refreshing to read about the work of individuals who have not been extensively studied by historians of recent biology—such as Edgar Anderson’s researches on plant variation and hybrid introgression and Robert Whittaker’s transects along ecological gradients.

Whatever its merits, however, this is a book that should be approached with caution. From the start, Kohler demonstrates a fundamental unease with, if not outright confusion between, his scientific and historical categories. Though the author seems to want to use the categories recognized by the historical actors, he quickly lapses into making border biology a historical—and scientific—category for his analysis. Even by the end of the book (where Kohler confidently asserts that by the mid-1930s “border biologists could expect to have stable and productive careers”) the reader is still left wondering, what exactly was or is border biology? The category is new with Kohler and was not recognized historically or in scientific practice.

Kohler’s problem with categories is also evident in his explication of his project: Exactly how much is left for a historical explanation of the science of evolution if we

exclude paleontology, biogeography, systematic botany and zoology, population genetics, and animal behavior, especially in the period the book covers? Should population genetics and animal behavior be classed as “laboratory sciences” that “deal in some way with field material”? And what precisely is one to make of references to something called microscopic morphology? Wouldn’t Kohler’s project be best served by categories like botany, zoology, and microbiology, which were relevant at the time? or, alternatively, perhaps simply the practice of microscopy? Is it fair to characterize a field



**Lab in the field.** For his experimental work on ecotypes, Harvey Hall established transplant gardens along a transect of California’s Sierra Nevada. His garden-tidy plots (such as Timberline station at 3000 m) were weeded, watered, and protected from browsers and genetic contamination.

like population genetics, which the historical actors thought was rich in theoretical insights, as practice?

The category problem is made worse still by the fact that Kohler adheres to an analytical approach that views categories as ahistorical abstractions, essentialized and typologized for analysis. This perspective fundamentally conflicts with his goal of historically embedding the categories as sets of negotiated cultural practices. What it is like to practice field biology is not quite the same thing as how the field(s) historically unfolded; how science actually works is not quite the same as how it came to be. That Kohler’s writing lapses from the historical past to the present tense (failing to observe the is-was distinction) and between synchronic and diachronic analysis reveals this conflict and makes for especially confusing reading.

One also would have expected to see more care with existing scholarship, especially because the author admits he is entering new terrain. His undergirding thesis is a version of the “naturalist-experimentalist” debate first articulated by historian of biology Garland Allen over 20 years ago. Also known as “the

Allen thesis,” this interpretation has been debated ad nauseum by an army of historians who have found it a fruitful starting point for examining the development of biology between 1890 and 1950 (an interval of time they have heavily mined). Kohler should have engaged the debate, instead of merely mentioning it in a footnote at the end of the chapter that sets the historical stage for his project. The problem is not simply that he has failed to engage previous historical scholarship, but that in the process he has grossly overstated the distinction between laboratory and field. The shortcoming recurs in the final chapter, where Kohler delves into the evolutionary synthesis; his treatment here is oversimplified at best and often misleading. Similar patterns of limited or no engagement with established historical scholarship are repeated throughout the book.

Nor is Kohler’s research into primary (or original) sources as comprehensive as his project demands. He has not systematically examined field notebooks, journals, and diaries—which would be essential starting points for reconstructing the experiences of field biologists. In many instances, he seems not to have taken advantage of entire collections of crucial archival materials. (For example, he has drawn nothing from the “Clausen, Keck and Hiesey” papers at the Missouri Botanical Garden or the papers of Harvey Monroe Hall at the University of California, Berkeley, both rich sources of material for the history of experimental taxonomy.) Kohler’s choice of scientists and relevant research projects is not fully representative of the history of ecology and evolution. Nothing is said, for example, of the most celebrated “border crosser,” zoologist Richard Goldschmidt. Though women appear in a number of photographs (especially as students or assistants), we never learn much of their experiences in the field. In addition, the book suffers from small technical errors of fact (e.g., *Drosophila obscura* for *D. pseudoobscura*), some incomplete referencing, and spelling and typographical errors (Hiesey is spelled two ways on one page; Johannsen and Turesson are spelled two ways in single paragraphs).

My reservations and criticisms aside, *Landscapes and Labscapes* provides valuable insights into the development of American field biology. It certainly will convince readers that the place of science—whether lab, field, or even desk—should be an important element in the history of science.