

**Summary of Themes and Questions Opened Up
in
UNRULY COMPLEXITY
ECOLOGY, INTERPRETATION, ENGAGEMENT**

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This book considers three angles—like facets of a crystal—from which to view the practice of researchers:

- A. their study of complex situations;
- B. their interactions with other social agents to establish what counts as knowledge; and
- C. their efforts to pursue social change in which they address self-consciously the complexities of their own situatedness as well as of the complexities of the situation studied.

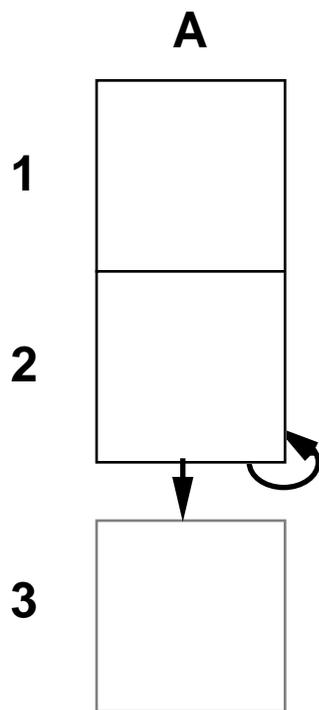
These angles are identified explicitly in Chapter 6, but are evident in the larger structure of the book's three parts: I. Modeling ecological complexity, II. Interpreting ecological modelers in their complex social context; and III. Engaging reflexively within ecological and social complexity. The complex situations referred to in angle A are primarily those studied in ecology and socio-environmental research, but the complexity of influences studied in the interpretation of science leads to an equivalent set of three angles.

For each angle, I discuss problems with simple formulations of well-bounded systems that have coherent internal dynamics and simply mediated relations with their external context (labeled type 1 formulations in Chapter 6). I contrast these formulations with work based on dynamics among particular, unequal units or agents whose actions implicate or span a range of social domains (type 3). I note, however, that simple formulations are easier to communicate than reconstructions of particular situations and simple formulations appear to have more effect on social mobilization. I introduce, therefore, an in-between kind of formulation (type 2): simple themes that open up issues, pointing to greater complexity and to further work needed in particular cases. Indeed, opening out across boundaries and opening up questions provides the impetus from each chapter to the next. This mode of expository and conceptual development is conveyed by the summary below of the book's themes and the questions opened up.

For each chapter the overall direction is conveyed through themes (denoted by •) that “point to” or “open up” (denoted by ->) a larger project or question (denoted by Q). This direction is also conveyed by the diagrams, which are subsets of the 3x3 framework introduced in Chapter 6. The letters and numbers refer to the angles and formulations of Chapter 6, restated above; see also the summary in Table 6.2 that lists specific cases.

PART I, MODELING ECOLOGICAL COMPLEXITY, considers the use of models to study complex situations—angle A—but ends by opening up angle B.

Chapter 1, **Problems of Boundedness in Modeling Ecological Systems**, proposes that:



- the construction of ecological complexity over time, its spatial embeddedness, and the dynamics of unmodeled variables make it problematic to theorize about complexity using models of well-bounded systems.

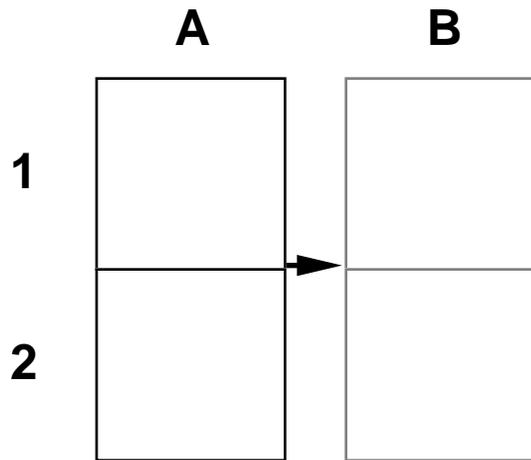
- new concepts, questions, hypotheses, and themes can emerge through exploring the qualitative behavior of simple models.

These two themes together

-> Q: how to investigate, not only the current configuration of any complex ecological situation, but also its particular history and spatial embeddedness within intersecting processes? (-> A3)

-> Q: how, when using a model heuristically, to assess its limits and minimize applying the model beyond its scope and being misled? (-> A2)

Chapter 2, Open Sites in Model Building, introduces a taxonomy of what ecologists do when they build models in which:

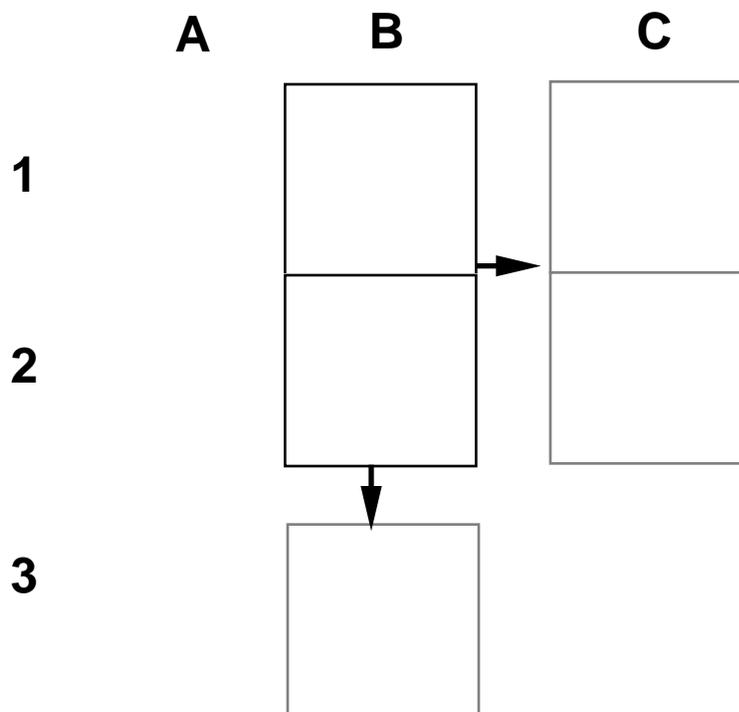


- the value of exploratory modeling for theory generation is a counterweight to an emphasis on testing specific hypotheses about particular situations.
 - there are always some open sites—categories and relationships accepted without explicit analysis of correspondence with evidence.
- > Q: how to identify and make sense of the influences on decisions that modelers make at the open sites? (-> B)

PART II, INTERPRETING ECOLOGICAL MODELERS IN THEIR COMPLEX

SOCIAL CONTEXT, corresponds to angle B, but, by emphasizing the interpretation of ideas with reference to the actions that the ideas facilitate, opens up angle C.

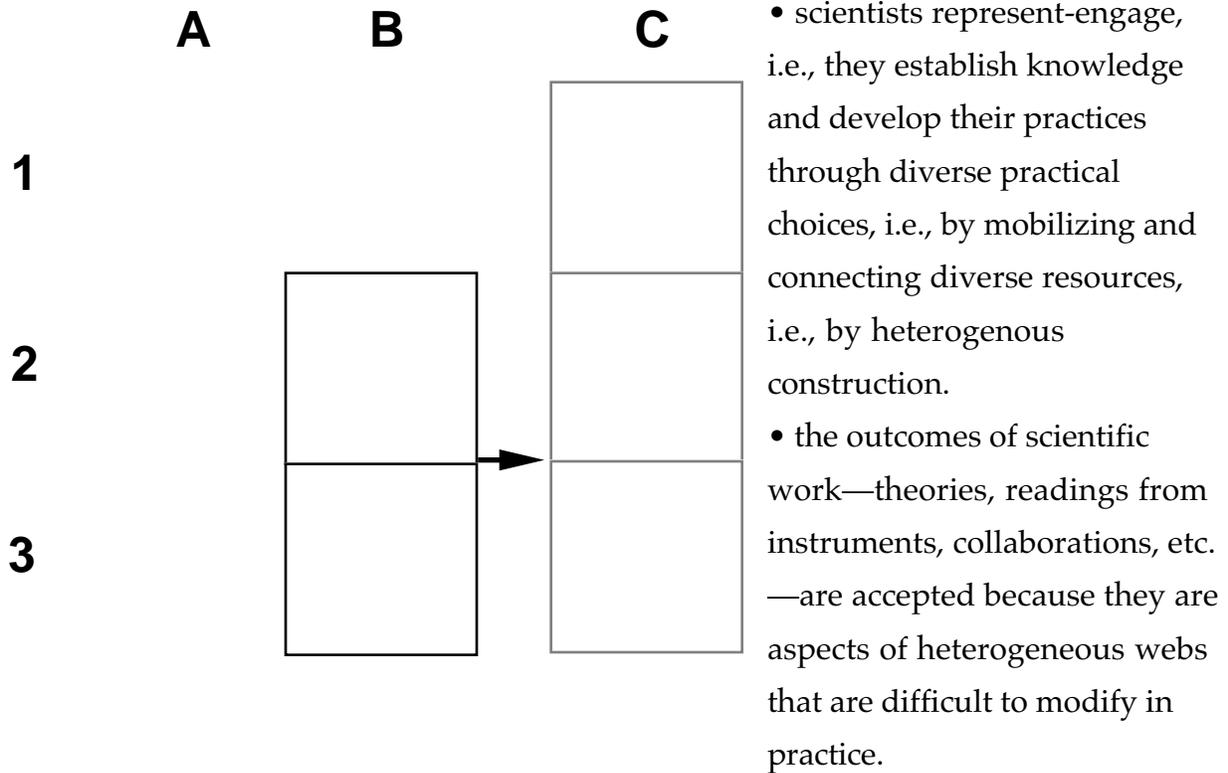
Chapter 3, Metaphors and Allegory in the Origins of Systems Ecology interprets the development of H. T. Odum's contributions to system ecology (a case of A1), noting that:



- clear correlations can be drawn among Odum's social context, personal experience, and scientific work.
 - the mechanism generating these correlations depends on Odum wanting the overlapping domains he inhabited—the social, personal, and scientific—to reinforce each other.
- > Q: how to show reinforcement across domains in cases where the social-personal-scientific correlations are less obvious or are less consistent over time? (-> B3)

-> Q: how to bring such interpretations—ones that show systematic effects of the sociality of ecological science on its referentiality—to bear productively on subsequent research? (-> C)

Chapter 4, Reconstructing Heterogeneous Webs in Socio-Environmental Research, interprets the modeling work in two short-term socio-environmental assessment projects (both cases of A1) so as to highlight ways that:

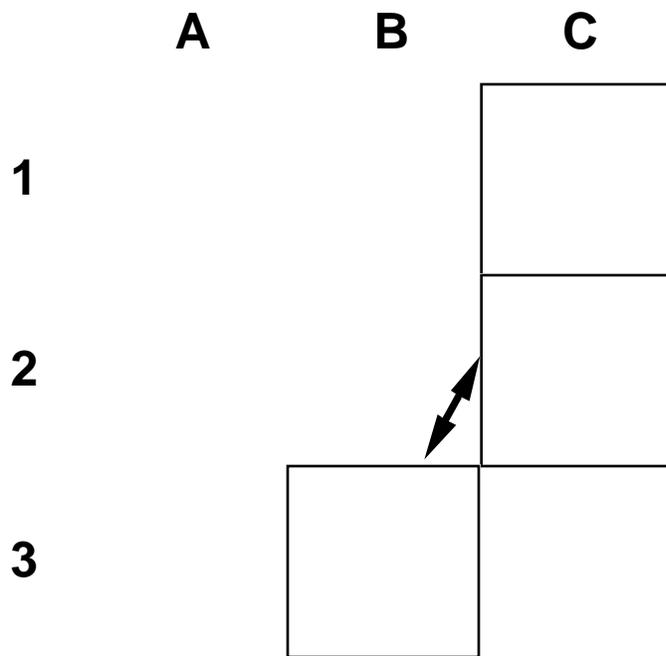


- interpretation of scientific work as heterogeneous construction exposes specific points at which concrete alternative resources could be mobilized.

-> Q: how to realize the possibility that explicit attention to scientists' diverse resources could help them—or others in comparable situations—alter their personal, scientific and social facilitations, and so modify the directions in which their science moves (-> C).

PART III, ENGAGING REFLEXIVELY WITHIN ECOLOGICAL AND SOCIAL COMPLEXITY, corresponds to formulations 1 and 2 of angle C, but ends by opening up formulation 3 of angle C for future work.[#]

Chapter 5, Reflecting on Researchers' Diverse Resources, reviews my efforts to engage researchers—interpreters of science and scientists—in analyzing researchers' diverse resources, and proposes that:



- interpreting science as heterogeneous construction requires conceptual and methodological choices in which practical considerations are implicated, which means that interpretation also involves heterogeneous construction.
- interpreters of research as heterogeneous construction should distribute the work of interpreting and engaging with that research, e.g., through leading researchers to

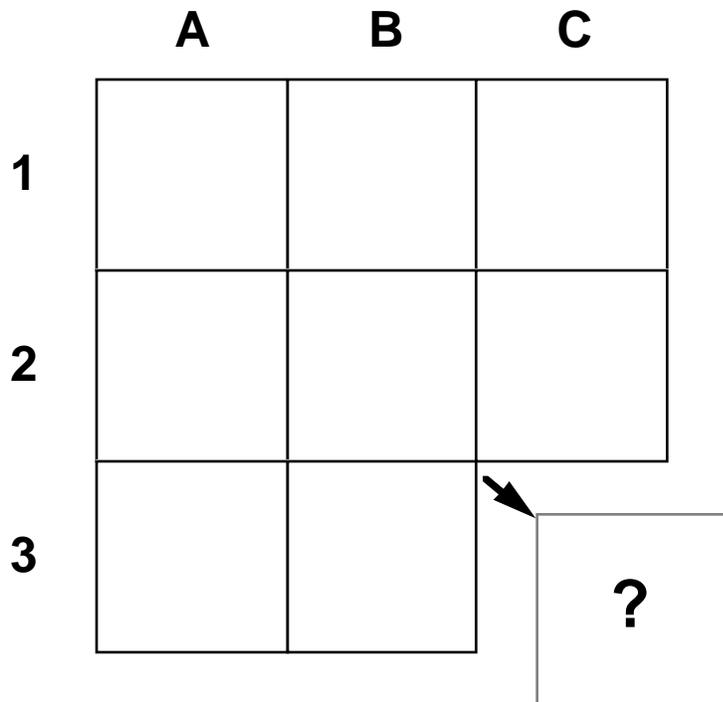
map the situations they study and their own situatedness, or, e.g., stimulating them to take initiative in mobilizing new resources and organizing them to support new directions in their work.

- there is a tension between a) the logic of exposing the situatedness of particular researchers— scientists and interpreters of science—and b) pragmatic choices that limit the probing of conceptual and methodological choices and that keep situatedness in the background.

-> Q: how, in practice, to open up researchers' situatedness in ways that facilitate its reconstruction? (->C)

[#] Part III also includes some reflexive interpretation of research that interprets science. If the object of research is the complexity of influences on the practice of scientists, then angles A', B', C' on the practice of researchers can be defined where "researchers" refers now to the interpreters of science.

Chapter 6, Reasoned Understandings and Social Change in Research on Common Resources, acknowledges that:



- system-like formulations are easier for members of an audience to digest than are particular cases of intersecting processes, heterogeneous construction, or practical reflexivity, but
 - it is possible to introduce simple themes that open up issues, pointing to greater complexity and to further work needed in particular cases.
- Indeed,

- knowledge-making agents are always moving:
 - a) between system-like formulations and accounts of unruly complexity;
 - b) among three angles for viewing their own practice—dialogue with the situation studied, interactions with other social agents to establish what counts as knowledge, and efforts to pursue social change by addressing the complexities of their own social situatedness as well as the complexities of the situations they study; and
 - c) between a concentrated view of their agency and awareness of conditions for modifying or restructuring their situatedness that are more distributed and dependent on the actions of other agents.

-> Q: how individuals, with their knowledge, themes, and other awareness of complex situations and situatedness, can participate with others in restructuring the distributed conditions of knowledge-making and social change? (-> C3)