

*Linnda R. Caporael, James R. Griesemer,
and William C. Wimsatt (eds.):*

Developing scaffolds in evolution, culture,
and cognition

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**History and Philosophy of the Life
Sciences**

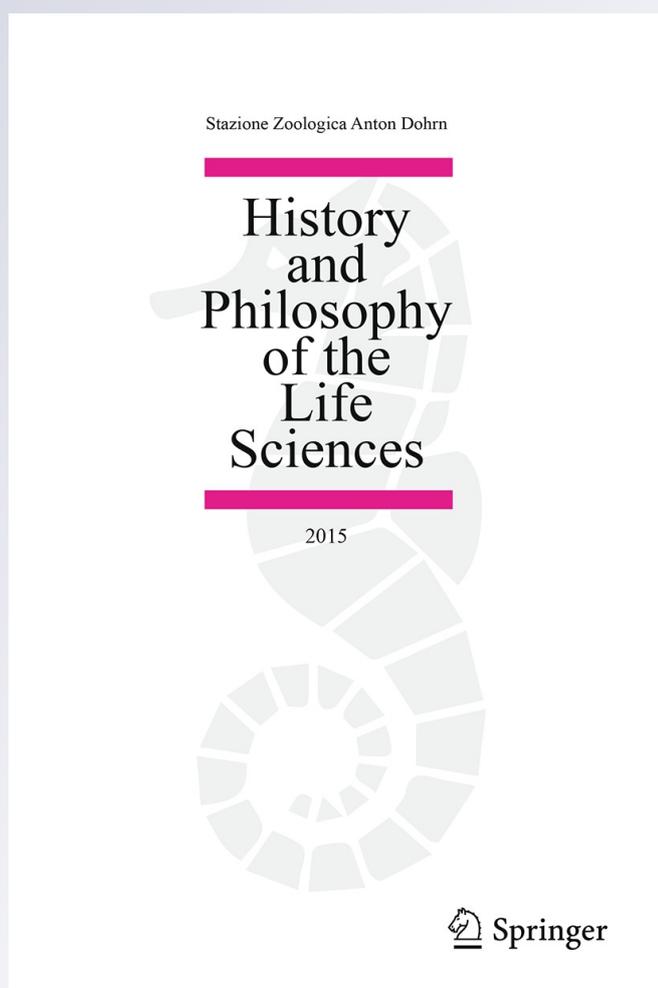
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LINNDA R. CAPORAE, JAMES R. GRIESEMER, and WILLIAM C. WIMSATT (eds.): *Developing scaffolds in evolution, culture, and cognition*

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Developmental psychologists have long used the metaphor of “scaffolding”—these transient structures used to build, renovate, and clean buildings—to refer to learning processes in humans where difficult tasks are decomposed into simpler, tractable ones, stressing the importance of temporary resources to support the cognitive, affective, or psychomotor development of a learner. The edited volume *Developing Scaffolds in Evolution, Culture, and Cognition* aims to further expand this metaphor of scaffolding in order to identify commonalities between a broader range of phenomena and interdisciplinary research, encompassing biology, cognition, culture, and economics.

The co-editors present the metaphor of scaffolding, in its broadest sense, as referring to the “(1) facilitation of a process that would otherwise be more difficult or costly without it, which (2) tends to be temporary” (p. 14). Scaffoldings are to partake in the production of complex dynamic systems, support their growth and participate in their maintenance, but they are also transitory processes, sometimes assimilated into the developing entity. In addition, developing entities must insure that the next generation benefits from similar scaffolding if the dynamic systems are to be renewed. The idea of a structure acting on the developing entity and external to it is expanded in a processual view of mutual support, reproduction, and integration, as developing entities and their scaffolding shape one another, both synchronically (co-construction) and diachronically (co-evolution).

By bringing the metaphor of scaffolding to the fore, the co-editors of the volume seek to offer a set of alternative narratives to disincarnated, reductionist, methodological individualism-driven, and monocausal scientific explanations. It is

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suggested that in a large range of scientific disciplines, the transitory nature and supporting role of scaffoldings have prompted scientists to focus on the end-results rather than on the constructive processes themselves, acknowledging the latter but black-boxing them. The alternative narratives developed in the anthology re-center scientific investigation—especially studies on human biological, cognitive, social, and cultural development—on networks of interactions at different scales of space and time and on the material underpinning and causal dynamics of the multiple levels of the complex systems. The authors of this anthology all adopt a deeply materialistic and development-conscious account of productive mechanisms and evolutionary processes.

By questioning 'standard' scientific narratives, the edited volume itself questions 'standard' bottom-up organization of chapter sequences—from biology to psychology to social sciences. Nine essays contributed by the participants of the workshop are organized through contrastive aspects that the co-editors saw fit to illustrate the multifarious complexity of scaffolding in diverse disciplines (II—Scope and scale; III—Generativity, entrenchment, and boundaries; IV—Granularity and reciprocity). Most of the essays individually make multiple traditional disciplinary boundaries overlap, and the collection itself spans over multiple levels of phenomena, from mesoscale physics to institutional change, passing by biological evolution, embodied cognition, education and development, research cultures and modeling in science, and technological design. The four last chapters, however, seem to have been deposited at the end of the volume as a kind of residue of this narrative reorganization (V—Reproduction and development). Nevertheless, as it is a motley collection of specialized essays, the reader is free to wander from one chapter to the next in any order. As such, the collection is worth exploring by anyone interested in philosophies and demonstrations of alternative scientific narratives.

The three first chapters (I—Towards materiality), written by the co-editors, differ from the contributed essays in that they theorize the scaffolding metaphor and elaborate on the rejection of standard narratives. The co-editors present three complementary perspectives on scaffolding, which consist mainly in an extension of their previous individual and collaborative work. By exposing how the interactions and material overlap relations between inheritance and developmental systems (Griesemer's reproducer perspective), human cognition and human groups (Carporel's repeated assembly perspective), and the material underpinnings of the multiple scales of cultural objects and processes (Wimsatt's generative entrenchment perspective) all depend on the construction of transient structures, these chapters stress the deeply material nature of biological inheritance, social interactions, and cultural change. In turn, they make clear how these phenomena and their scaffoldings themselves participate in the production and re-production of organisms, human minds, and human cultures. Each essay also stresses the importance of opening the black-box, whether it is the developmental and material underpinnings of inheritance (in contrast to gene-centred evolutionary biology), the multi-leveledness of face-to-face interactions (in contrast to disembodied evolutionary and cognitive psychology), or the constructional and developmental dependencies of multiple levels of cultural entities (in contrast to formal, atomic

approaches to cultural evolution). Each chapter focuses on specific case studies, but the conceptual framework is meant to be expandable to a more general study of scaffoldings in any empirical domain. The co-editors' chapters, as many others in the collection, are inspiring, and they offer a welcome elaboration on their previous work.

Where the anthology suffers, however, is in failing to stand up to the additional aim of making “a substantive contribution to theoretical biology and, more-specifically, to human evo-devo” (p. 1) through this “project of grand theorizing” (p. 3). The grand project, presented in the introduction and reassessed in the conclusion, aims to expand on the three co-editors' perspectives as an overarching framework to study complex dynamic systems, their evolution, and their development. However, the description of the framework fails to provide a clear definition of many important concepts, although these concepts are recurrent throughout (see the example below). This sadly leaves important points obscure, and most importantly it can frustrate even the most serious and dedicated reader by having to dig through the co-editors' difficult prose (and their numerous previous papers) to hopefully find some clearer referent that would illuminate how the project can inform the reader's own research. These difficulties play against the co-editors' project by maintaining the notion of scaffolding as a general, place-holding metaphor that encompasses pretty much any interacting phenomena above physics and inorganic chemistry. For instance, one of the rare passages (the only one I could find) where the co-editors discuss what *does not* constitute scaffolding leaves no clear impression of a real demarcation: “What is *not* scaffolding? One feature would be a process that lacks productive resistance or challenge. For example, where two or more processes are incommensurable or disengaged, there is no scaffolding relation because there is no resistance that facilitates an otherwise more difficult or costly result” (p. 15). We are not told, however, how “resistance can facilitate”, and as an educated guess I suppose that the co-editors mean something like “canalization”, itself a metaphor in genetics.

Ultimately, the language makes it difficult to figure out how to use the co-editors' perspectives and grand framework on scaffolding in a non-metaphorical, theoretical and/or operational manner. Many authors of the volume also seem to struggle with the blurring between a metaphorical and theoretical understanding of scaffoldings, as some chapters point out here and there that something or some process scaffolds another, rarely evoking the three co-editors' grand theorizing project—and when they do so the authors arguably do not actually employ the framework to do theoretical and/or explanatory work. Of course, this is to be expected of an edited book of this sort, and as the co-editors point out, the title of the book is “Developing scaffolds” rather than “Developed scaffolds”. Nevertheless, the “substantive contribution” (p. 1) promised in the first sentence of the book fails to encompass the book-wide project. Taken as an anthology, however, the edited volume is worth exploring thanks to its high-quality and thought-provoking individual chapters.