

FORSCHUNGSKOLLOQUIUM ZUR WISSENSCHAFTSGESCHICHTE

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Arches and Scaffolds: Bridging Continuity and Discontinuity in Theory Change

In principle, new theoretical structures in physics, unlike arches and other architectural structures, could be erected without the use of any scaffolds. After all, that is essentially how the four-dimensional formalism of special relativity, the curved space-times of general relativity, and the Hilbert-space formalism of quantum mechanics are introduced in modern textbooks. Historically, however, such structures, like arches, were originally erected on top of elaborate scaffolds provided by the structures they eventually either partially or completely replaced. The metaphor of arches and scaffolds highlights the remarkable degree of continuity in instances of theory change that, at first sight, look strikingly discontinuous. After putting to rest some historiographical scruples about the metaphor, I describe how some key steps in the development of relativity and quantum theory in the early decades of the 20th century are captured quite naturally in terms of arches and scaffolds. Given how easy it is to find examples of this kind, I argue that it may be worthwhile to further analyze this pattern of theory change with the help of some of Stephen Jay Gould's ideas about evolutionary biology, especially his notion of constraints.

Michel Janssen is professor of History of Science at the University of Minnesota. He is a member of the graduate Program in the History of Science, Technology, and Medicine, the School of Physics and Astronomy, and the Center for Philosophy of Science at Minneapolis. His research area is the history of modern physics. Guiding his research in general are broader philosophical questions about scientific methodology and theory change.

Achtung: geänderter Termin!

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