Physical Models: Their Historical and Current Use in Civil and Building Engineering Design ed. by Bill Addis (review)

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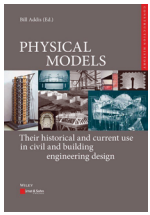
Technology and Culture, Volume 63, Number 4, October 2022, pp. 1250-1251 (Article)

Published by Johns Hopkins University Press

OCTOBER
2022
VOL. 63

Physical Models: Their Historical and Current Use in Civil and Building Engineering Design

Edited by Bill Addis. Berlin: Wilhelm Ernst & Sohn, 2021. Pp. 1113.



Readers of *Technology and Culture* will find a great deal of useful information in this edited collection but may also find some frustrations. The focus of the book is the somewhat neglected subject of the role of physical models in the history of design from ancient times to the present. The editor argues that physical models provide a way for designers to convey ideas to those who build engineering artifacts and to provide a way to test that the designed artifact will function as intended. As such, physical models represent a crucial "third strand" along with theory and practice in the development of engineering science. Nearly half of the book deals with physical models that were developed from ancient times through the 1930s. The book has a very large number of photographs, drawings, charts, graphs, and other illustrations that allow the reader to more fully understand how the models function and their role in engineering design. The book is well organized, first focusing on historical time periods and then on specific design projects such as Filippo Brunelleschi's design of the dome of Florence Cathedral, Leonhard Euler's model for a bridge in St. Petersburg, the models used in the Conway and Britannia tubular bridges in Great Britain, and the use of models in the design of the Boulder Dam.

With only a few exceptions, the contributors to the volume are trained in engineering or architecture. The editor has a Ph.D. in the history and philosophy of engineering along with a background in the aerospace industry. A small number of contributors have some training in the history of architecture, but aside from the editor only one or two contributors have backgrounds in the history of technology. Because of this, much of the literature on the history of technology that involves modeling and structures, such as works by Edwin Layton, Terry Reynolds, Walter Vincenti, David Billington, and Eda Kranakis, among others, are not cited in the volume.

Not surprisingly, given the backgrounds of the contributors, the volume follows a very internalist approach to the history of physical models. With the exception of some discussion of testing laboratories, there is almost no engagement with the idea of contextual history. There is little discussion of how physical models have been shaped by society and culture and how society and culture have been shaped by the use of different types of physical models. While the idea of physical models as a "third strand" in shaping engineering science is mentioned in the preface, there is no continuing or broad analysis of how the development of physical models have interacted with theory of practice to contribute to the development of engineering science.

While the volume covers a tremendous amount of material, there are some surprising topics that are not covered. For example, the chapter on the development of arch construction during the ancient period makes almost no reference to the Roman use of the arch and subsequently the dome. The chapter on wind tunnels tends to focus on testing buildings and bridges and therefore neglects any discussion of the Wright brothers' use of wind tunnel testing. Many major bridge projects, such as the Conway and Britannia bridges and the Tacoma Narrows Bridge, are covered, but there is no discussion of the Brooklyn Bridge. But if a reader wants to gain an almost encyclopedic knowledge of the technical details of almost any type of physical modeling, this book would be a very useful resource.

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Citation: Channell, David F. "Review of *Physical Models: Their Historical and Current Use in Civil and Building Engineering Design* edited by Bill Addis." *Technology and Culture 63,* no. 4 (2022): 1250–51.

Les artilleurs et la monarchie hispanique (1560–1610): Guerres, savoirs techniques, État
[Artillerymen and the Hispanic monarchy (1560–1610): Wars, technical knowledge, and the State]

By Brice Cossart. Paris: Classiques Garnier, 2021. Pp. 674.

While artillery is seen as a technique with major consequences—key to the military revolution, the rise of the Modern State, and the European overseas expansion—the very nature of this technical change, its chronology, and its components still largely remain to be established (even after the pioneering works of B. S. Hall, Ph. Contamine, or B. Buchanan). Historiographic cathedrals are erected on sand. Hence the major interest of Brice Cossart's book, based on a thesis defended in 2016, which undertakes to answer the question of the mode of training and the nature of the knowledge of the artillerymen of the Hispanic monarchy in the second half of the sixteenth century. Such a formulation of the question doesn't restrict its ambition. Apart from the scale of the archival examinations that support it, the book is placed at the meeting point of important historiographical fields, which the author not only knows well but to which he makes significant contributions.

His first step is to quantify the needs of the monarchy in gunners, thus revealing to what extent the expansion of a sailing navy, in particular with