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*Kunstkammer, Laboratorium, Bühne: Schauplätze des Wissens im 17. Jahrhundert* (**Theatrum Scientiarium, Band 1**). Hrsg. von Helmar Schramm, Ludger Schwarte, und Jan Lazardzig. Berlin: Walter de Gruyter, 2003; xxix + 609 pp. \$217.00 cloth.

*Collection, Laboratory, Theater: Scenes of Knowledge in the 17th Century* (**Theatrum Scientiarium, Vol. 1**). Edited by Helmar Schramm, Ludger Schwarte, and Jan Lazardzig. Berlin: Walter de Gruyter, 2005; xxix + 594 pp. \$217.00 cloth.

***Instrumente in Kunst und Wissenschaft. Zur Architektonik kultureller Grenzen im 17. Jahrhundert (Theatrum Scientiarium, Band 2).***

Hrsg. von Helmar Schramm, Ludger Schwarte. und Jan Lazardzig. Berlin: Walter de Gruyter, 2006; xxix + 626 pp. \$189.00 cloth.

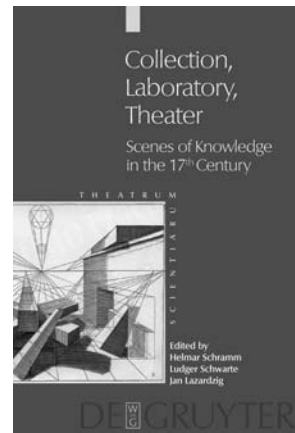
***Instruments in Art and Science: On the Architectonics of Cultural Boundaries in the 17th Century (Theatrum Scientiarium, Vol. 2).*** Edited by Helmar Schramm, Ludger Schwarte, and Jan Lazardzig. Berlin: Walter de Gruyter, 2008; xxvii + 575 pp. \$128.00 cloth.

***Spektakuläre Experimente. Praktiken der Evidenzproduktion im 17. Jahrhundert (Theatrum Scientiarium, Band 3).*** Hrsg. von Helmar Schramm, Ludger Schwarte. und Jan Lazardzig. Berlin: Walter de Gruyter, 2006; xxxviii + 567 pp. \$189.00 cloth.

***Spuren der Avantgarde: Theatrum machinarium. Frühe Neuzeit und Moderne im Kulturvergleich (Theatrum Scientiarium, Band 4).*** Hrsg. von Helmar Schramm, Ludger Schwarte. und Jan Lazardzig. Berlin: Walter de Gruyter, 2008; xxxii + 533 pp. \$165.00 cloth.

Theatrum Scientiarium is the title of a unique series that, once it's completed, will comprise a total of eight volumes dedicated to new ways of examining the historical interplay between art, science, and media from the early modern period until the present. The large-scale interdisciplinary series forms a central part of the research project Performativity of Knowledge as Agent of Cultural Change, led by Helmar Schramm, professor in the theatre studies department at the Free University Berlin. This series promises to contribute innovative and inspiring approaches not only to theatre and performance studies, but also to the history of science. This is, at least in part, due to the wide range of contributions by acknowledged international scholars from various disciplines in the recent and previously published volumes, including Barbara Maria Stafford, Horst Bredekamp, Georges Didi-Huberman, and Peter Galison, to name a few. Representing physics, architecture, art history, media studies, technology, history of science, theatre studies, philosophy, and sociology, the totality of the articles in these four volumes establishes a dynamic structure of creative approaches that challenge and transcend traditional borders between disciplines and academic schools. Therefore it is certainly not an exaggeration to say that the series opens up innovative new approaches to the study of scientific practices in the 21st century.

The project is clearly located in the discourse of theatricality and performativity that has developed in the past 15 years, especially in the German context of theatre studies.<sup>1</sup> Due to the international character of the project, the editors have opted for a publishing strategy that combines both German and English. In Walter de Gruyter they found a publishing house capable



1. The project forms a part of the broader long-term German Research Foundation funded project Cultures of the Performative led by Erika Fischer-Lichte. See Helmar Schramm's *Karneval des Denkens. Theatralität im Spiegel philosophischer Texte des 16. und 17. Jahrhunderts* (1996); and Erika Fischer-Lichte's *Theatralität und die Krise der Repräsentation* (2001).

of realizing this concept in an effective way. Four of the planned eight volumes have already appeared in German, and the first two have also been published in English translation. All volumes are carefully and rigorously edited, complete with comprehensive bibliographies, image credits, and indices of names and of subjects. Most articles are illuminated by high-quality illustrations of 17th-century engravings and frontispieces.

“Theatrum Scientiarum” indicates the performative practice of the series itself, presenting the relationship between the sciences and the arts along the lines of theatrical settings. More precisely, it establishes dynamic relationships between the observer/reader and the representational space of knowledge on the one hand, and between the spatiotemporal organization of seeing (image) and speaking (text) on the other. This approach is based on the general idea that “the constitution of modern knowledge is linked in many ways with dimensions of staging and construction” (2005, 1:xiv). The authors avoid getting trapped into a legitimization and implementation of the history of knowledge, nor do they regard it as a way of rationalization and progress. Even less do they want to present historical sources according to classical methods of historical interpretation. It is the *interference* between practices of art and science—like observation and presentation—actually performed in the texts that opens up dynamic approaches to new fields of knowledge. This includes even the work of Gottfried Wilhelm Leibniz, one of the most prominent scholars of the early modern period, as Horst Bredekamp shows in the first volume of the series. Shedding light on the almost unnoticed affinity of Leibniz to the *Kunstammern* of his time, he unfolds Leibniz’s plans to create a theatre of nature and art, an extensive collection of libraries, observatories, and laboratories to promote practices of interconnected knowledge “with a liberty of thought which was never achieved again” (2005, 1:266).

Over the course of the whole series, the individual volumes are organized around different aspects of research: *Theatrum anatomicum*, *Theatrum machinarum*, *Theatrum alchemicum*, *Theatrum politicum*, and *Theatrum philosophicum*, which will conclude the project. The titles are the keywords that illuminate the general difference from classical methods of historical interpretation: they are clearly linked to the semantic field of theatre and allow for a dynamic interplay with several territories of the sciences in a combinatory way, which leads to the highly creative approach of locating precise “scenes” of modern knowledge since the 17th century.

The first volume (*Collection, Laboratory, Theater: Scenes of Knowledge in the 17th Century*) very coherently traces the lines defining these new fields of knowledge by playing through the different spatial arrangements of possible sceneries of presentation and observation: cabinets of wonder, laboratories, and theatres. The 24 contributions in the book form a dense intertextual network that is spun around these basic concepts, departing from detailed case studies, or from theoretical questions concerning the history of science, or from historical cartographies of space constructions, like Ludger Schwarte’s journey through various observational spaces between imaginary conceptions, the anatomic body, and the realm of publications in the 17th century.

Already in this first volume the title, *Theatrum Scientiarum*, appears to be programmatic for the discursive and representational strategy that is envisioned for the entire series. It sets out to examine and challenge the idea that, in its interplay between seeing and acting, observing and (re)presenting, playing and arranging, theatre is an instrumental asset of knowledge production. *Theatrum Scientiarum* puts this idea to a test precisely in order to arrive at a better understanding of the conditions of knowledge production in European history. It is this strategy of combination that allows access to the trajectory of Western art and science as deep historical-cultural spaces of action—indeed thus as an arrangement of different *stages*—of knowledge.

This becomes even more evident if we look at the second volume, *Instruments in Art and Science: On the Architectonics of Cultural Boundaries in the 17th Century*. Both volumes form part of the first aspect of the *Theatrum* series, the *Theatrum anatomicum*. But while the first volume mainly points to presentational spatial arrangements of knowledge production that go along with vision, beholding, and arranging, the second volume focuses on the instrumental dimen-

sions of these arrangements, shifting the attention to action, production, and performance. Using the example of the hand as first and foremost a human instrument, in the introduction to this volume Helmar Schramm traces in a very lucid way the connection between action and instruments in experimental sciences and arts in the 17th century. He refers to a renewed relevance of Aristotle's *Poetics* in the 17th century in order to establish a connection between the operation of dissection in the operating theatre and the word-action coupling in aesthetic theatre through their common linkage to the "hand as symptomatic instrumentum instrumentorum of our time" (2008, 2:xi–xii).

In this context the range of contributions to this volume oscillates between questions concerning the development of new instruments and devices of measurement, calculation, and recording in the experimental sciences out of the spirit of mechanics and mathematics (including Sibylle Krämer, Hans-Jörg Rheinberger, Bruno Bachimont); relationships between hands, instruments, and techniques in the visual arts and music (Frank Fehrenbach, Jörg Jochen Berns, Nicola Suthor, and others); and last but not least the spectacular aspects of experimental settings, machines, and optical devices (for example, Jan Lazardzig, Florian Nelle, Don Ihde).

This entire historical enterprise goes along with the interrogation of cultural boundaries and barriers of view that gives rise to the practice of "playing with" the usual demarcation lines of the sciences and arts. One of the most interesting theses of the publication is that Western culture, since the beginning of modern science in the 17th century, has been organized by permanently shifting interpretations of Aristotle's poetic rules of drama. The common theoretical denominator to envision the practicability of opening out unusual or new perspectives is grounded in the assumption that "the development of the historical constitution of knowledge, or the associated formalization of thinking, is linked with the stylization of three cultural factors: perception, movement and language" (2005, 1:xiv). This triangular approach has to be understood as a way of considering exactly the *dynamics* of these concepts in their precise historical and cultural relationships to each other: in space and time, in vertical and horizontal directions; across the relationship of image, text, and number, and across connected relationships of processes of theory formation, practical experimentation, and technical intervention, not to mention the local settings for the production of knowledge, such as cabinets of wonder, laboratories, and theatres. At the heart of this combinatory approach lies the principle of play. The play of the traces and borders of these dynamic structures results in new arrangements and perspectives. It not only makes possible what the editors call "the architectonics of cultural boundaries," but it also allows for the realization of precisely that crossover in the deep cultural-historical space of European science and art that forms one of the main goals of the research project.

In spite of the obviously vast complexity of the whole project, the series reveals a startling logic by the clear, and at the same time playfully structured, interconnections between the particular volumes. This becomes most evident if one takes into account the German third and fourth volumes that are not yet published in English.<sup>2</sup> Subsequent to the concentration on spatial (place) and instrumental (hand) dimensions of the *Theatrum anatomicum* in volumes one and two, volumes three and four investigate scenes of knowledge concentrating on the European history of *experimental culture*. While volume three (*Spektakuläre Experimente. Praktiken der Evidenzproduktion im 17. Jahrhundert*) deals with the production of evidence by *spectacular* experiments in science and art, volume four (*Spuren der Avantgarde: Theatrum machinarium. Frühe Neuzeit und Moderne im Kulturvergleich*) expands the view on experimental culture through an extra historical and medial dimension. More precisely, it opens up the space for the *Theatrum machinarium* by investigating the significance and patterns of movements produced by machines

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2. The third volume is announced to appear in English at the end of 2010.

in scientific and artistic experiments between the early modern era and the artistic avantgarde of the early 20th century. The interconnectedness and, at the same time, the difference between the last two volumes are to be found in the structurally related and yet separated lenses used to examine experimental culture.

Volume three brings together articles that interrogate the ways in which the eye-ear pair is related to the activation of hearing and letting one hear as much as seeing and letting one see. This focus on perceptual modes of experimentation in terms of spectacularization and witnessing is ordered along the lines of a “heuristic cartography” (2006, 3:xiii) that links each of them to spatial, anthropological, and instrumental orders. They guide the reader through the diverse worlds of wonders, explosions, and effects, first questioning the evidence by linking four different historical and disciplinary snapshots (in the essay by Hans-Jörg Rheinberger), and ending with the staging of an encounter between two fathers of experimental culture, Francis Bacon and John Cage, to claim that the cultural history of modernity has to be understood as a history of the experiment and the experimental (Lydia Goehrs). The overlapping maps of space, body, and apparatuses lead the reader to discover the intersections of disciplinary and spatiotemporal approaches from which the individual contributions are departing. Most of the contributions—and this is an especially intriguing aspect of the whole volume—investigate the interplay of experiments between artistic, public, and scientific spaces: Gerhard Neumann’s article about the impact of instruments like the telescope, the microscope, and the balloon on the crisis of perception and new narrative strategies in the literature around 1800 is only one example. Another paradigmatic contribution for this volume is Victoria Tkaczyc’s research on “Cumulus ex machina: Staging clouds in theatre and science.” Here, she demonstrates the complex interconnection between diverse cultural forces like craftsmanship, theatre, science, and engineering in the early modern period, linking them to theoretical approaches to cloud appearances and machineries from René Descartes, Galileo Galilei, Nicola Sabbatini, Joseph Furtenbach, and Robert Hooke.

Finally, in volume four we are confronted with the use of machines correlated to their *movement patterns* caused by the activities of “going” and functioning (or *not* going and *not* functioning) that constitute another setup of artistic and scientific experiments. Of additional interest is the link between objects, terminology, and methods that is opened up at the same time. The terms *Gang* (way, walk) and *Gangart* (pace) count as much for the description of the way machines and men work as for a specific methodological *Vorgehen* (approach) or *Fortschreiten* (to progress, march on) to understanding the dynamics of experiments and machines in the history of culture and knowledge. The hybridity of the terminology that connects technology, philosophy, and anthropology points to a certain understanding of these experiments in relation to space and body, to rhythms, disruptions of rhythms, new velocities, and techniques of movements. They are interrelated in terms of new machineries as well as artistic performances such as the explosion of dance and new choreographic patterns in the historical avantgarde and in the big literary experiments of that time, such as those of Marcel Proust, James Joyce, and Gertrude Stein (2008, 4:xv).

All of this introduces the reader to astounding new insights. At this point, a few examples will suffice to illuminate the epistemological dimension of the new approaches to historiography in *Theatrum machinarium*. Hannes Böhringer throws fresh light on the relationship between the baroque *Machina Machinarium* of state and church, and the religiously connoted sense of departure that went along with the avantgarde machineries. Another cluster of contributions deals with the question of the way in which connections between source documents such as machinery scripts, magic literature, and technical drawings reveal constellations of machine, magic, and power (for example in the essay by Martin Burckhardt). And in his article about paradoxical machines, Jan Lazardzig shows that the cofounder of the Dada movement, Tristan Tzara, drew his inspiration from the mannerist-like figurative constructions of Giovanni Battista Bracelli (1600–1650).

The editors offer a justification for the extensiveness of their ambitious series, stating that it is warranted “by the conviction that an appropriate understanding of the interaction of today’s medial configurations of scientific programs and artistic practice is only possible in the awareness of [a] long-time historical process” (2005, 1:v). Whoever wants to test the ambition and productivity of this perspective should read the already published volumes. We believe that *Theatrum Scientarium* is the first serious historical enterprise in the context of theatre studies that may lay claim to continuing Michel Foucault’s project of the archeology of knowledge.

—Kati Röttger and Alexander Jakob

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