

# Embodied ephemerality: Methodologies and historiographies for investigating the display and spatialization of science and technology in the twentieth century

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## Abstract

Exhibitions are embodied knowledge, and the processes of making exhibitions are also in themselves knowledge production practices. Science and technology exhibitions are therefore doubly of interest to historians of science: both as epistemic agents and as research methods. Yet both exhibitions and exhibition-making practices are ephemeral, as is the subsequent experience of the visitor. How can we research, interrogate, and understand both the productive creation of exhibitions and the phenomenologies and epistemologies of their reception and impact? “Exhibition histories” has become a significant field of late, most closely associated with research on art exhibitions but also extending to world and trade fairs, and now increasingly crossing over into histories of science and technology. It is not an easy task: the range of exhibition archive materials includes – but is not limited to – 35mm slides, architectural blueprints, models, drawings, briefs, memos, budgets, press films, reviews, and personal accounts. This primary material is distributed unevenly across public and organized repositories, closed commercial archives, the personal papers of designers, often embargoed national bureaus of information, and more. Further, the experience of visiting an exhibition leaves far fewer traces to follow, requiring the researcher to do different kinds of things with the same widely varied material. This paper proposes methodologies for historians of science and technology wishing to understand the spatialization of science in exhibition contexts, the impacts of science exhibitions, and the more elusive phenomenological aspects of the exhibition visitor experience. Historians of science must accurately historicize

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context while researching both along and against the grain of archival material left by the making of exhibitions, as well as understanding the embodied trajectories of visitors. The practice of *making* exhibitions can also offer the researcher critically valuable insights into what to look for – and what may be absent – in archival records.

### Keywords

Design archives, design historiography, domestic technology, exhibition design, exhibition histories, practice-based research, research methodology, world fairs, Hans Fischli, Peter Fischli

## Introduction: Moving through spatialized thought

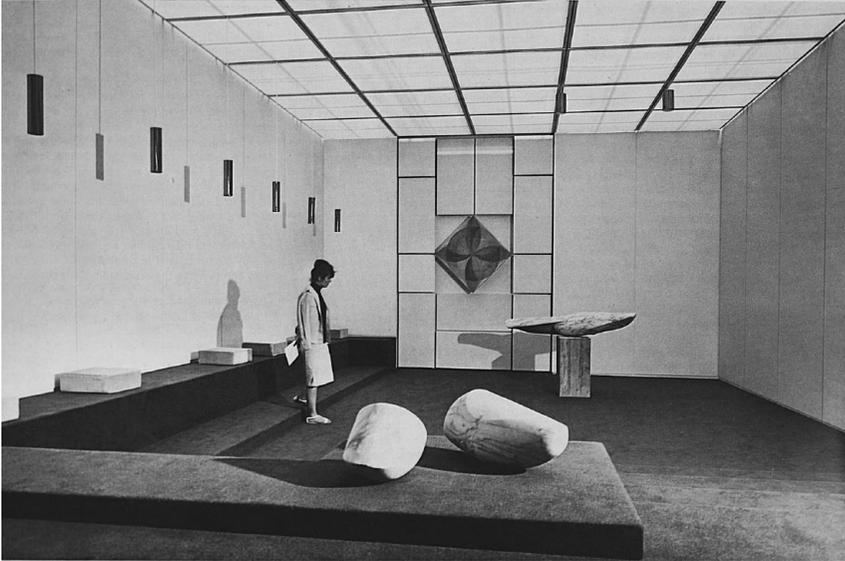
She stands alone, immaculately dressed and yet clearly unsettled. It is 1964 and she is visiting an exhibition, an industrial design exhibition: *La Triennale di Milano* (Figure 1), which in that year was dedicated to leisure time – the ultimate product of industrial modernity, the product that would sell all other products throughout much of the twentieth century.<sup>1</sup>

Like most exhibitions recognized by The Bureau International des Expositions, *La Triennale di Milano* is organized around a thematic subject yet remains nonetheless structured logistically around national entities and their economic interests. Our visitor is experiencing the Swiss Pavilion, which in 1964 was designed by Hans Fischli, a Swiss architect and exhibition designer trained at the Bauhaus and elsewhere.

Our visitor has been captured by the photographer perhaps as an indicator of scale, as if she were a female version of Le Corbusier's Modulor (Figure 2); or perhaps as a living embodiment of Herbert Bayer's suited eyeball in "Fundamentals of Exhibition Design" (Figure 3).<sup>2</sup> She does not appear to be contemplative, but rather uncertain and isolated. Though this particular event is billed as an industrial exhibition, the Swiss Pavilion contains no kettles, pots, pans, cars, ovens, hoovers, or other time-saving consumer goods that produce – or promise – leisure time. We can see the deep influence of *japonisme* and zen in the midcentury northern modernist architectural style, but still the visitor is not at rest.

What we recognize in her disconcertion is a state of being many will have experienced while moving through spatialized thought; thought that has been materialized through the disposition of objects in dimensional relations and through the deployment of esthetic strategies and technological infrastructures. These "events" – in which our

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1. Triennale di Milano, *Tempo libero, Tempo di vita* (13<sup>th</sup> Triennale di Milano, Parco Sempione, Milan, 1964). The recent MA thesis of Giulia Ciliberto contains an extensive and informative section on the 1964 edition: *La Triennale di Milano: fra costruzione e critica del design in Italia* (Master's Degree Dissertation, Università IUAV di Venezia, 2012), <[https://issuu.com/giuliaciliberto/docs/giulia\\_ciliberto\\_triennale\\_high/100](https://issuu.com/giuliaciliberto/docs/giulia_ciliberto_triennale_high/100)> (March 11, 2019), pp.235.
  2. Le Corbusier, *Le Modulor: Essai sur une mesure harmonique à l'échelle humaine applicable universellement à l'architecture et à la mécanique* (Boulogne: Editions de l'Architecture d'Aujourd'hui, 1948). Herbert Bayer, "Fundamentals of Exhibition Design," *PM: An Intimate Journal for Advertising Production Managers, Art Directors and their Associates* (December 1939–January 1940): pp.17–25.



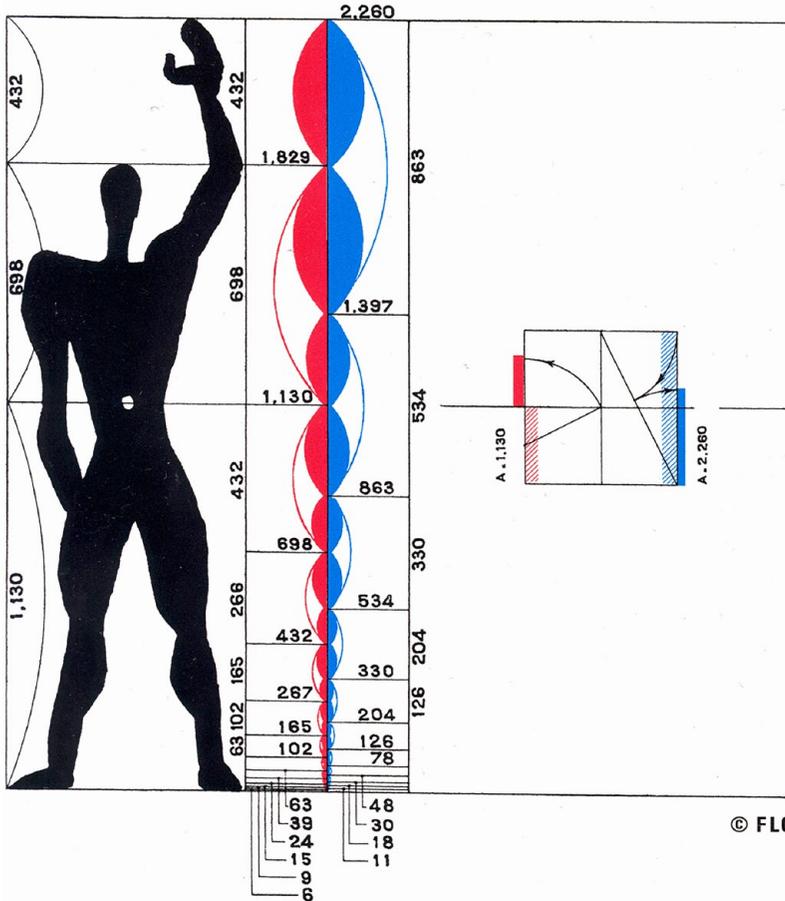
**Figure 1.** Unknown woman in the Swiss Pavilion, Milan Triennale, 1964. Exhibition design by Hans Fischli. Photographer unknown. Reproduced in *Conceptions of International Exhibitions* (Zurich: ABC Editions, 1969), p.20.

entire bodies are already deeply enmeshed from the moment of entering an exhibition – are the thoughts of others arranged to persuade us of a point of view.

It is 1964. Her unease may well be related to the then relative novelty of the phenomenon of leisure time.<sup>3</sup> It may well be evidence of an inability to understand how to “be” inside time for which there is no purposeful “doing.” After all, this photo was taken less than twenty years after the end of World War II. As historians, we understand the economic and ideological mechanisms and conditions that may produce the idea of leisure time and its consumer, but we have more difficulty in identifying the representational mechanisms at work in an ephemeral exhibition that evidences those historical contexts even as they are happening – and still greater difficulty in articulating the phenomenological conditions of experiencing such an exhibition and its message at its given moment. To be able to do all three would be nothing short of an epistemology of the production and reception of exhibitions.

Many of the authors of the papers collected in this special issue of *History of Science* have confronted these epistemological difficulties in the highly specific contexts that are the focus of their research. Exhibitions are a key phenomenon in the spatialization of science in the twentieth century, and both material culture and affect studies have, alongside slow but sure alignments between the history of science and visual studies, brought exhibitions into the limelight in the humanities of late. Exhibitions matter to historians of science because, from

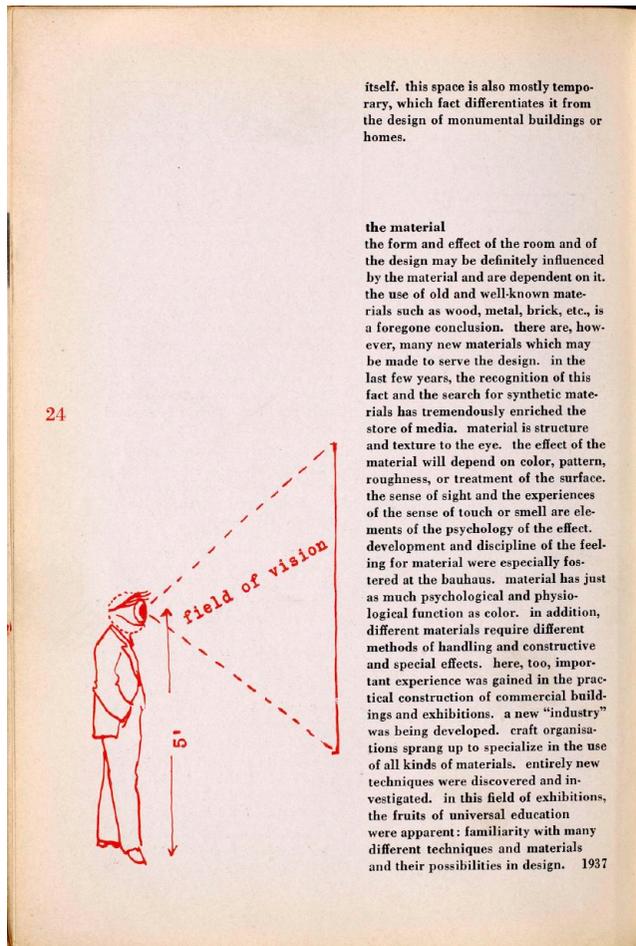
3. The history of leisure, the production of leisure time, and the legislative frameworks of employment law and remuneration across Europe and beyond are significant to both the advent and the experience of exhibitions from the start of the industrial era: these subjects are beyond the remit of this article.



**Figure 2.** Le Corbusier: *Le Modulor* (1945) © FLC / ADAGP, 2019.

the mid-1800s on, they have been created, produced, and experienced in almost all the sites of significance to science, technology, and medicine. This includes spaces such as clinics and labs as well as both international and specialist trade fairs, naval and other military posts, physics workshops, hospitals and public health centers, marine stations and aquariums, arboretums and botanical gardens, planetariums and observatories, zoos, and more. The exhibition as a communication form is far from being the exclusive practice of museums.<sup>4</sup>

4. The museum as a site of the production of knowledge and of science practice – in natural history, for example – is now a comparatively familiar construct to many historians of science. Less well understood is the distinction between museums and collections (not all of which reside in museum contexts), and between museums and exhibitions (not all of which take place in museum contexts). For clarification on the first point see the publications of the *University Museums and Collections Journal*, and in particular the work of Cornelia Weber. For clarification on the second point, particularly for historians of science new to museum and exhibition practice, see Anke te Heesen, *Theorien des Museums* (Hamburg: Junius Verlag, 2012), pp.224.



**Figure 3.** Herbert Bayer, *Fundamentals of Exhibition Design* (1939–40), Digital Collections, New York Public Library: UUID 4c6e25b0-c606-012f-37d3-58d385a7bc34.

The exhibition, wherever it takes place, must be understood as a key element in any *chaîne opératoire* that connects practices in science, technology, and medicine with the social sphere, thus influencing commerce, policy, and public opinion alike.

Display techniques, as well as their underlying imaging techniques, have been fundamental to the development of all observational methods in science, including such varied practices as zoological morphology, electron counting in physics, and human embryology.<sup>5</sup>

5. Historians of science addressing visualization displays in the three cited areas are: Helen J. Blackman, "The Natural Sciences and the Development of Animal Morphology in Late-Victorian Cambridge," *Journal of the History of Biology* 40–41 (2007): 71–108 for morphology; Jimena Canales, *A Tenth of a Second* (Chicago: University of Chicago Press, 2010), pp.288 for physics; Nick Hopwood, *Embryos in Wax: Models from the Ziegler Studio* (Cambridge: Whipple Museum of Science, 2002), pp.206 for embryology. The wider field of intersection between visualization,

Display techniques devised to both test and demonstrate coherent deductions are drawn from observations made through imaging: exhibition practices have thus developed hand in hand with the increasing mastery and centrality of visual practices in the sciences. X-rays, all sky survey photography, histology, botanical illustration: all are visualization techniques that shape and form not only specialization in scientific inquiry but also the physical requirements of the sites of such specialist practices. In this nexus of visual practices and specialized locations, a display culture and spatialization of science is produced – a contact zone between research methods and public understandings. Research in this zone requires interdisciplinary approaches, and the application of methods developed and refined in disciplines cognate to ours: the history and theory of art, of design, and of media.

In this article, I chart some of the historiographic roots of the concepts in exhibitionary histories and of the research toward them. Further, I propose some techniques for historians wishing to approach exhibitions analytically by examining the evidence that remains of these activities and by differentiating the various influences on the creation of exhibitions and the conditions of their production. These include advanced techniques in collections-based research for documentary materials unique to exhibition histories, as well as practice-based methodologies in the making of exhibitions today.

Robust methods in the history of science and technology able to address this exhibitionary nexus and its contexts can be found in the work of Sybilla Nikolov on the histories of the Deutsches Hygienes Museum through the twentieth century, and in the work of Oldenziel and Zachman on the General Electric Kitchen display at the American National Exhibition in Sokol'niki Park, Moscow, in 1959.<sup>6</sup> Identifying and analyzing exhibition production processes and the techniques at work in their historical contexts is of critical importance to history of science if it is to be incisive about the recent visual

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research, and display in the history of science is of course addressed in Lorraine Daston and Peter Galison, *Objectivity* (Cambridge, MA: MIT Press, 2007), pp.504 and Luc Pauwels (ed.), *Visual Cultures of Science: Rethinking Representational Practices in Knowledge Building and Science Communication* (Hanover, NH: Dartmouth College Press, 2005). pp.328.

6. Sybilla Nikolov was the principal investigator of the Volkswagen-Stiftung funded research project, "'Erkenne Dich selbst!' Visuelle Gesundheitsaufklärung mit Wissensobjekten aus dem Deutschen Hygiene-Museum Dresden im 20. Jahrhundert" <[www.dhmd.de/sammlung-forschung/forschung/erkenne-dich-selbst/](http://www.dhmd.de/sammlung-forschung/forschung/erkenne-dich-selbst/)> (March 11, 2019). A further joint project of the Deutsches Hygiene-Museum and the Technische Universität Berlin was co-investigated by Nikolov and funded by the German Federal Ministry of Education and Research (BMBF): "Anthropofakte. Schnittstelle Mensch. Kompensation, Extension und Optimierung durch Artefakte." There has been extensive analysis of the American National Exhibition that took place in Moscow in 1959, produced by the United States Information Agency. It is addressed in Ruth Oldenziel and Karin Zachmann, *Cold War Kitchen: Americanization, Technology, and European Users* (Cambridge, MA: MIT Press, 2009), pp.432 as well as in Kate A. Baldwin, *The Racial Imaginary of the Cold War Kitchen: From Sokol'niki Park to Chicago's South Side* (Lebanon, NH: University Press of New England, 2015), pp.256. Wider issues of exhibition design, the Cold War, and the United States Information Agency (USIA) are addressed in Jack Masey, *Cold War Confrontations: US Exhibitions and their Role in the Cultural Cold War* (Baden: Lars Mueller, 2008), pp.424 and Andrew James Wulf, *US International Exhibitions during the Cold War: Winning Hearts and Minds through Cultural Diplomacy* (Lanham: Roman and Littlefield, 2015), pp.356.

and material culture of science and the increasingly postmedia status of science and science communication alike. Part of this research must be archivally based – albeit in archives the structure and contents of which are not familiar to most historians of science, as I shall demonstrate in the section *Step by step: Methodology from the masters*.

Another aspect of this analysis can and should be practice-based: the making of exhibitions teaches the complexity of these techniques from the inside out, even across historical divides. This practice can also enable acuity in the appropriate application of exhibition-making as a research method in the humanities, and create the conditions in which exhibition methods can be fully aligned with epistemological inquiry. A small group of historians of science (of which I am part) have adopted and adapted the exhibition form as a mode of research and a discursive exegesis with specific historiographic advantages, material and experiential.<sup>7</sup>

Attempting the conjectural work of investigating the *reception* of exhibitions requires a set of methods rarely deployed in history of science: reception theory, phenomenology, and anthropological stances such as affect theory. These three areas have always held a vexed relationship with historiography in general, and it is possible that attending to the problematic of exhibition histories may hold a particular promise of resolving some of the current incompatibilities between methods and histories of production and reception.

Standing at midpoint between production and reception is *intentionality*. The vignette of the visitor to the Swiss Pavilion of the 1964 Triennale of Milan has a correlative in my micro case study: that of the expressed intentions of the exhibition's designer. In 1969, Fischli published the following in *Conceptions of International Exhibitions*: "The planner of an exhibition must know the receptive capacity of the visitors to an exhibition and speak to them in their language – not his own – short and to the point."<sup>8</sup>

The modernity of this statement resides in Fischli's clear desire to become invisible as an agent in the event, and relates to an effect on the visitor that would have been required by the emerging soft-power cultural diplomacy of the period, as well as the ambitions of national industries dreaming then of globalized economies to come. That effect would be to have the visitor come to the "correct" conclusion without any sense that this conclusion was foregone and even dictated; dictated through the meticulous spatial disposition of images and objects.

In order to gage the effectiveness of the impact on visitors, evaluations of exhibition experiences – through surveys and focus groups – became increasingly the metric currency of international exhibitions over the twentieth century. There is a certain hermeticism to these visitor studies, as both evaluation and trade fairs originate in a similar

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7. Two important publications exploring this historiographic territory are: Susanne Lehmann-Brauns, Christian Sichau, and Helmuth Trischler (eds), *The Exhibition as a Product and Generator of Scholarship*, Preprint 399 (Berlin: Max-Planck-Institut für Wissenschaftsgeschichte, 2010), pp.120; and Anke te Heesen and Margarete Vöhringer (eds), *Wissenschaft im Museum. Ausstellung im Labor* (Berlin: Kadmos, 2014), pp.250. Both are the proceedings volumes from exploratory conferences: the present author participated in both events and both publications.

8. Hans Fischli, "Some Aspects from the Exhibition Architect's Point of View," in *Conceptions of International Exhibitions* (Zurich: ABC Edition Zurich, 1969), pp.212.

behaviorist marketing context. Evaluation metrics can offer only the most prismatic and anamorphosized of understandings of the experiential (and indeed the existential) aspects of the exhibition for visitors. Behaviorism cannot produce a phenomenology of exhibition-going. Inchoate perceptions, fleeting affect experiences, and a heightened state of “being in the world” – all part of the exhibition visit – cannot be articulated in answers to direct survey questions.<sup>9</sup>

As well as understanding that technologies administrate spectatorship, we must attend to the subjective singularities that are produced incessantly in any exhibition visitor, if only to at least acknowledge that we are not yet fully able to articulate such singularities with precision. Architectural and design phenomenology are well developed fields, and a spatial turn in humanities began with Bachelard, Foucault, and Lefebvre, encompassing both existential and political aspects of the experience of produced spaces. We must borrow and adapt these methods, and also turn toward developments in human geography and current research in esthetics that can help us as historians to approach exhibitions from both sides – production and reception.

The exhibition is an intensely modernist and modernizing form and a highly contested territory: it remains porous, though circumscribed; it is experienced by individuals in utterly unique and personal trajectories, even though that very experience is highly public and sociable – political, in short. In a further paragraph of Fischli’s short contribution to *Conceptions of International Exhibitions*, we get a sense of the designer’s highly refined self-reflexivity and political awareness, which seem almost entirely devoid of the positivism that lies at the core of most “international exhibitions” and their ultimately economic project.

When the Triennale Milano 1964 chose the topic of “Leisure” for its central topic of interest I got to know the negative side of state-organized utilization of spare time during the preliminary work and as a result was not prepared to publicize this. Because I saw to what a chaotic type of presentation the Triennale in general was reduced, I planned the pavilion of our country as a place of rest. An ornamental wall-picture and three suitably formed stones to consider and handle were intended to stimulate the visitor to contemplation.<sup>10</sup>

The frankness of Fischli’s excoriating analysis of the instrumentalizing utility to the state of manufactured leisure time is startling. It is as if he wished to shield the visitor from the state’s covert invasion of the work she would constantly have been effecting in order to constitute her own subjectivity. The irony is that it would appear from the accompanying photograph (of our solitary visitor) that the existential discomfort of the designer in contending with the exhibition brief has osmotically transfused through even the oasis he intended to create. Fischli again:

The original task of an exhibition as being a visual means of communication has become questionable. The long period required for preparation and execution hinders and endangers

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9. The most valuable and incisive analysis known to me of the behaviorist origins of exhibition evaluation is Ghislaine Lawrence, “Rats, Street Gangs and Culture: Evaluation in Museums,” in Gaynor Kavanagh (ed.), *Museum Languages: Objects and Texts* (Leicester: Leicester University Press, 1991), pp.180.

10. Fischli, “Some Aspects,” p.27 (note 8).

actuality. The exhibition is fixed in one place and the visitor must go there. A traveling exhibition is not a very great improvement... The old method of representing a topic by means of a picture and a text has run itself to death on the weary path of the visitors. Automatic slides or film series, interspersed in the static type, are an improvement because they shorten the distance that has to be covered but are often tiring for an arranged group sitting in a darkened room. Active demonstrations are also called in to break the monotony, for people are always willing to stand still and look if something is actually happening – even when it is only a bottle-filling machine.<sup>11</sup>

The immense difficulty of connecting with the visitor, and the offer of “suitably formed stones to consider and handle,” pares the experience back to touching, being, feeling. Fischli proposes something that is somehow both primordially intense – “touch this rock” – and existentially devastating – “communication is near-impossible.” We are on the cusp of globalized consumerism – something critical in both the history of the world and the subjectivity of an individual – and yet there is no bottle-filling machine; nothing that “is actually happening.” We are in an exhibition.

What is an exhibition and how does it come into being? How is meaning constructed within it and out of it, and what does it mean to move through and to experience an exhibition? What is it that happens to us in exhibitions, cognitively, phenomenologically, existentially? Of course, the answers to these questions are highly contingent – on historical periods and contexts, on disciplines that emerge over time and are altered by time, on political as well as social and economic conditions, and on the nature of what is exhibited and the aims of the exhibition. They are also contingent on the agency, skills, and liberties of the team of exhibition makers, and ultimately on the highly singular subjectivity of each and every exhibition visitor – at that personal moment, in that place and cultural context, during that epoch.

It’s not just that exhibitions demonstrate a zeitgeist: they also produce it. Understanding how this takes place through exhibitions is a significant project of historians. We visit exhibitions. We study exhibition histories. We make exhibitions. Integrating these activities into a reflexive, articulate, and analytical whole that rigorously incorporates the constitutive realities of both objects and subjects has to be a major goal of scholarship.

Researchers in the history of science have begun to focus more intently on twentieth century exhibitions as a discursive locus, and the *Matières à Penser* project is a significant consolidation of this practice, integrating it with material and visual culture studies and museology.<sup>12</sup> The study of twentieth century exhibitions as forms of experimental historiography embedded in cultural and temporal specificities can be seen in the sustained inquiry concerning German cultural-historical exhibitions of the 1970s and 80s recently coauthored by Mario Schulze, Vincent Dold, and Anke te Heesen – *Museumskrise und Ausstellungserfolg: Die Entwicklung der Geschichtsausstellung in den Siebzigern*

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11. Ibid., p.64.

12. *Matières à Penser: les mises en scène des sciences et leurs enjeux. 19e - 21e siècles*” (2013–2015) was an international research network led by Charlotte Bigg and Andrée Bergeron: this special issue of *History of Science*, edited by Bigg and Bergeron, is one of the outcomes of that project. Together with an earlier investigation entitled “Voir/savoir: Manières de voir et représentations visuelles dans les sciences” (2012–2013), these distinct projects addressed, in discursive interplay, the visual and material cultures of science, the evolution of science communication and its specialisation, and collections and exhibitions.

(Berlin: Lehrstuhl für Wissenschaftsgeschichte, Institut für Geschichtswissenschaften, Humboldt-Universität zu Berlin, 2015). Increasing numbers of historians of science are attending to the “technology deploying technologies” constituted by the displays and exhibitions emergent in the twentieth and twenty-first centuries: these demonstrate the reflexive recursivity of innovation, from mobile room partitions to mechanical slide-shows and immersive media experiences.<sup>13</sup>

From 2018–22, at the University of Göttingen, Margarete Vöhringer (Professor of the Materiality of Knowledge) in collaboration with the University Collections’ research staff will be supporting and supervising no less than seven four-year doctoral studentships in this field, specifically addressing late-twentieth-century exhibitions in a range of disciplinary and subject fields across Europe. Several of these doctoral students will also be producing exhibitions as part of their research process. London’s Science Museum holds a block grant of doctoral studentships from the UK Arts and Humanities Research Council, which enables it to support projects such as James Fenner’s 2014 doctorate “British Small Craft: The Cultural Geographies of Mid-Twentieth Century Technology and Display” – one of several hundreds of collaborative doctoral awards effected with museums and archives over the past decade in the United Kingdom. This research, teaching, and training is contributing to the methodological advancement of the history of science.

### **A short and partial history of “exhibition histories”**

Exhibition histories as a form appeared in several disciplines at once in quick succession at the end of the 1990s. These three seminal publications were each the result of at least a decade of research: *Thinking About Exhibitions* (1996); *The Politics of Display: Museums, Science, Culture* (1998); and *The Power of Display: A History of Exhibition Installations at the Museum of Modern Art* (1999).<sup>14</sup> Thinking, politics, and power are the operative words in the titles of all three, and this should come as no surprise given that these exhibition histories range across art, science, and technology. Though none of

13. Temporary and transportable exhibition design structures have elicited considerable attention as pivotal technologies in knowledge production and dissemination. The multivalent and provisory nature of temporary exhibition structures has proven to be of inestimable methodological value in the case of the use made by Aby Warburg, for example: Aby M. Warburg, *Der Bilderatlas: Mnemosyne, Gesammelte Schriften II.1*, Martin Warnke and Claudia Brink (eds) (Berlin: Akademie, 2008). For analysis focusing on the functional epistemology of the panels, see Anke te Heesen, “Exposition Imaginaire: Über die Stellwand bei Aby Warburg,” *Fotogeschichte. Beiträge zur Geschichte und Ästhetik der Fotografie* (2009), 29; 112: 55–64. Artist Martin Beck has effected extensive archival and practice-based research into the use and impact of the temporary exhibition structures designed in 1948 by George Nelson and called “Struc-Tube.” Martin Beck, *About the Relative Size of Things in the Universe* (London and Utrecht: Four Corners/CASCO, 2007), pp.64.

14. Bruce W. Ferguson, Reesa Greenberg, and Sandy Nairne (eds), *Thinking about Exhibitions* (London: Routledge, 1996), pp.512; Sharon Macdonald (ed.), *The Politics of Display: Museums, Science, Culture* (London: Routledge, 1998), pp.246; Mary Anne Staniszewski, *The Power of Display: A History of Exhibition Installations at the Museum of Modern Art* (Cambridge, MA: MIT Press, 1998), pp.371.

these publications stray far from the museum as a locus for exhibitionary practices – misleading given the much wider range of most exhibition sites themselves – all three develop robust and valuable methods that can be transferred to other contexts, such as that of the technological trade show for example.

Taking a tightly institutionally focused approach, Staniszewski's *The Power of Display: A History of Exhibition Installations at the Museum of Modern Art* tracks the evolution of exhibition presentations and design exclusively at the Museum of Modern Art in New York from its inception in the 1920s through to the book's publication in the 1990s.<sup>15</sup> A science and technology counterpart can be found in Macdonald's subsequent work, *Behind the Scenes at the Science Museum*: her extensive case study of the creation of an exhibition at the Science Museum is a landmark in the field, deploying sociological as well as science-historical methods to unpick the political and economic constraints on science exhibition creation at the end of the twentieth century.<sup>16</sup>

The early 1990s' cultural-historical interest in exhibition histories was undoubtedly sparked by the concurrent development in the 1970s and 1980s of developing historiographies of collecting and of the museum, which were being forged by museum professionals on the one hand, and that of "institutional critique" as an artform practiced by a number of artists in Europe and North America on the other. In the latter category, the work of artists Marcel Broodthaers (Belgium) and Michael Asher (United States) are among the most piercing and coherent early examples. In the former category, the work of material culture historians Adalgisa Lugli (Italy), Arthur MacGregor (England), and Antoine Schnapper (France) are exemplary. Tony Bennett's 1988 article "The Exhibitionary Complex," concerning display, collection, and colonialism, sits at the very center of *Thinking About Exhibitions*, and was published in the same year as Paul Greenhalgh's groundbreaking *Ephemeral Vistas: The Expositions Universelles, Great Exhibitions and World's Fairs, 1851–1939*.<sup>17</sup>

Though Greenhalgh's work begins more than 100 years before the mid-century period in which our spectator is visiting the Swiss Pavilion at La Triennale di Milano, it is a key methodological guide for analyzing exhibitions of science, technology, and industry well into the twentieth century, and in commercial and mercantile contexts far from the museum. The coproduction of industrial standardization and exhibitionary cultures is a nexus of considerable import to historians of science: Greenhalgh's is:

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15. This period includes the 1968 MOMA exhibition *The Machine as Seen at the End of the Mechanical Age*, curated by Pontus Hulten, which remains a magisterial historiographical achievement in the analysis of technological cultures, with its locus in an art museum and its form as an exhibition. *The Machine* as an exhibition was heavily influenced by Siegfried Giedion's *Mechanization Takes Command: A Contribution to an Anonymous History* (New York: Oxford University Press, 1948), pp.743 and by the preceding MOMA exhibition, *Machine Art: Objects 1900 and Today*, curated by Alfred Barr and designed by the modernist architect Philip Johnson in 1934.
  16. Sharon Macdonald, *Behind the Scenes at the Science Museum* (Oxford: Berg, 2002), pp.293.
  17. Tony Bennett, "The Exhibitionary Complex," *New Formations*, No 4: Cultural Technologies (Spring 1988), pp.73–102. Paul Greenhalgh, *Ephemeral Vistas: The Expositions Universelles, Great Exhibitions and World's Fairs, 1851–1939* (Manchester: Manchester University Press, 1988), pp.245.

a compelling study of the interconnections between imperialism, nationalism, market competition, and hegemonic cultural ambitions of European nations from the mid nineteenth century to the eve of World War II. Greenhalgh describes in detail the financing, propaganda efforts, display of colonies and colonized people, representation of women, and of the fine arts in these giant extravagant spectacles... and the development of prefabrication and mass-production as offshoots. Greenhalgh's examination includes the descriptions of the physical displays and sites, as well as the documentation of their planning and financing and evidence of government and private intentions.<sup>18</sup>

Here we get to the heart of what any coherent historical study of an exhibition of any kind must address as a *minimum*: the vested interests and aims; the physical and economic constraints; the materials and the esthetics; the experiential dimensions for visitors; and the vastly wider impacts of exhibitions over time. The scale of the world trade exhibition is monumental; attention to its details has, over the past thirty years, extruded some eminently transferable analytical tools.<sup>19</sup>

### Step by step: Methodology from the masters

In France, and in parallel to Greenhalgh, Brigitte Schroeder-Gudehus and Anne Rasmussen published, in 1992, *Les fastes du progrès: le guide des expositions universelles, 1851–1992*.<sup>20</sup>

Schroeder-Gudehus is an emeritus member of the Department of Political Science at the University of Montreal and Rasmussen is an historian of science at the University of Strasbourg – an interdisciplinary collaboration that speaks to the complexity of the field of exhibition studies. Covering a wider time period than Greenhalgh, the analysis at the

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18. J. F. Codell, "Ephemeral Vistas – The Expositions-Universelles, Great Exhibitions and Worlds-Fairs, 1851–1930 – Greenhalgh, P.," *The Journal of Pre-Raphaelite Studies*, 3, no 2 (1994): 78–81. Often overlooked is the fact that Greenhalgh's significant survey, which opened up the field of research in the production and reception contexts of international exhibitions, was actually published in a Manchester University Press series entitled "Studies in Imperialism" that was "Established in the belief that imperialism as a cultural phenomenon had as significant an effect on the dominant as on the subordinate societies, SII seeks to develop the new socio-cultural approach which has emerged through cross-disciplinary work on popular culture, media studies, art history, the study of education and religion, sports history and children's literature," according to the text on an unpaginated verso of the frontispiece of *Ephemeral Vistas*.
  19. Nearly thirty years after Greenhalgh's *Ephemeral Vistas*, more granular and epoch-specific approaches to the form of the world fair are appearing: Robert H. Kargon, Karen Fiss, Morris Low, and Arthur P. Molella, *World's Fairs on the Eve of War: Science, Technology, & Modernity, 1937–1942* (Pittsburgh: University of Pittsburgh Press, 2015), pp.206. These approaches are welcome, and show how the range of primary sources, which will remain very similar across the archival remains of world's fairs over the past 150 years, can be analyzed with greater historical specificity and contextualization.
  20. Brigitte Schroeder-Gudehus and Anne Rasmussen, *Les fastes du progrès: le guide des expositions universelles, 1851–1992* (Paris: Flammarion, 1992), pp.253. The title translates roughly as "The Bounty of Progress: A Guide to Universal Exhibitions, 1851–1992."

heart of their work is structural rather than conceptual, and is therefore crucially valuable to those wishing to effect primary research and adapt valuable methods. Having reviewed available documentation relating to nearly 150 years of international exhibitions, Schroeder-Gudehus and Rasmussen present each exhibition they have studied as a series of elements; this not only assists researchers methodologically, but also invites the possibility of developmental comparison of exhibitionary practice across the whole period. It is worth paraphrasing in full their rigorous list of archival elements to be consulted in researching the production of international exhibitions, as it constitutes a valuable map of a terrain in which many require orientation.<sup>21</sup>

- Official designation (under which aegis the exhibition is held)
- Theme (such as, in the case of *La Triennale di Milano* 1964, leisure time)
- Symbol (this can be conceptual as well as a visual logo or mascot)
- Anchor or architectural manifestation (the site or building)
- Category of exhibition (this section identifies the category of exhibitions that are registered by the *Bureau International des Expositions* (BIE), following the adoption of their 1928 Convention)
- Location (city as well as position within the specific urban fabric)
- Dates (historical anchors)
- Physical extent or area (allocated space)
- List of exhibitors (often highly political and indicative of links between industries and nation-states; it is interesting to note the omissions as well as the inclusions)
- Visitors (their number and demographics)
- Entry costs
- Construction costs (I would add a caveat that the host country's costs are only one part of the financial story, as each country will have individual costs of exhibiting as well)
- Legal structure and financing
- Corporate hierarchy and chains of command
- International participation roster
- National buildings and pavilions
- Congress and conference activities
- Systems of jurying, awards, and prizes

These are the discrete and interconnected areas of primary research that any historian of exhibitions of any subject or scale across the full 150 years of the nineteenth and the twentieth centuries would need to undertake in order to ensure a thorough documentary overview – even if the analytical approach to those primary sources would need to be much more tightly honed to specific periods. Most, if not all, of the above themes can be researched by accessing official documents, numbers of which will be publicly available and even nowadays in some cases digitized. Of course, the usual archival research caveats

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21. The rigorous itemization of archival materials laid out by Schroeder-Gudehus and Rasmussen appears to have been of fundamental utility to more recent researchers in the history of exhibitions, from Anke te Heesen to Kargon and others.

apply: not everything that one would like to see has been deemed worthy of keeping, or of cataloguing. “Access” is not so easy as it sounds, depending on the scale of the exhibition. The larger it is, and the more public funding there has been, and the more recent the exhibition, the more likely it is that there are archival deposits that have been made, and are currently both in order and accessible. As we are all aware, access to evidential documents is in any case a long way from access to the events they purport to document.

But there is one final heading listed by Schroeder-Gudehus and Rasmussen that encompasses a great swathe of activity that would need to be parsed much more closely to be effective for historians of science.

### *The stages: aims and motivations, initiators, preparatory activities*

The intention of this rubric is to get to the source of the decision to originate each exhibition: the articulated aims (most often a historical, civic or national commemoration) and the initiators involved, whether they be institutions or individuals (politicians, businessmen, councillors), or pressure groups that have been created for the purpose... These sources constitute *a posteriori* reconstructions authored by actors implicated in the events vindicating their enterprise, and in so doing sometimes invest it with too great a meaning, developing a teleological account of the development of the exhibition... Nonetheless, these origins, industrial sagas, and foundation myths usefully inform us concerning universal exhibitions and their imaginaries.<sup>22</sup>

In order to chart the evolving relations between individuals, institutional entities, and ideational and ideological positions that together initiate an exhibition project, one would need to have fully identified these disparate interlocking elements at different periods of time over the organic development of each exhibition. Finding these accounts (in both public and private archives), reading them analytically to extract the probable events from the otherwise embellished histories, and then reading them again and against the grain, in order to consider what hidden needs and desired effects are expressed in their more hyperbolic rhetorical structures, is not a simple task. It requires all the historiographic skills one might employ in any archival research endeavor and it is in exploring this particular area of the exhibition nexus that we will find methodologically useful some of the muscular tools that the study of science and technology has produced – discourse analysis, induction, actor network theory, affordance analysis, multiscale approaches, and boundary object study.

This is as true for research in exhibitions relating to science and technology as it is of the highly codified universal exhibitions with which Schroeder-Gudehus and Rasmussen are concerned. They rightly point out that manuscript sources are even more difficult to trace than printed materials or even minutes and memoranda – “Private and personal archives of individuals responsible for the organization of exhibitions or participations are as precious as they are difficult to find.”<sup>23</sup>

One regularly needs to effect microhistorical analyses that read across a range of official documents to extrude the identity of agents who are absent from the official story or

22. Schroeder-Gudehus and Rasmussen, *Les fastes du progrès*, p.15 (note 20). Translation by the author.

23. *Ibid.*, p.20 (note 20). Translation by the author.

occulted within it – especially when it proves “difficult to find” their papers. Who might these invisible agents be, in exhibitions significant to historians working on the spatialization of science in the twentieth century, for example?

## Designers: Invisible agents

Designers of exhibitions, fabricators of exhibition elements and structures, and exhibition technicians and audiovisual professionals are among the most significant of these agents: they are not mentioned by Schroeder-Gudehus and Rasmussen, even under “preparatory activities.”<sup>24</sup> Hiding in plain sight, their crucial and formative contributions are often reflected in official archives only through progress reports and invoices. Several commendable recent publications give a sense of the scale of what is yet to be researched and analyzed in depth in relation to exhibition design and technologies.

*New Exhibition Design 1900–2000* (2008) is a sweeping panorama of exhibition design in Europe over the entire twentieth century.<sup>25</sup> Structured chronologically, the book includes basic information about a number of universal, industrial, propagandistic, traveling, urban planning, communication, and art exhibitions. Though not comprehensive, it is an important resource for orienting researchers new to these issues, and it contains a series of in-depth articles about significant exhibitions that will be of particular interest to historians of science: “Textbook for the World: The 1930 International Hygiene Exhibition in Dresden,” by Kau-Uwe Hemken, and “‘Musée Sentimentale de Cologne’ by Daniel Spoerri and Marie Louise von Plessen” by Anke Te Heesen, to name but two.<sup>26</sup>

An exemplary instance of an in-depth and sustained history of a specific exhibition occurring at the zenith of postwar esthetic and technological modernity, Peter Wever’s 2015 book *Inside Le Corbusier’s Philips Pavilion: A Multimedial Space at the 1958 World’s Fair*, will be of considerable interest to historians of science and technology.<sup>27</sup> The Pavilion was commissioned by the electronics corporation Philips, who appointed the French architect Le Corbusier. In essence, Philips’ major innovation was to employ Le Corbusier to create an

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24. To be fair to Schroeder-Gudehus and Rasmussen, the professional identity of “designer” is emergent over the period that is the temporal scope of *Les fastes du progrès*, and it would be ahistorical to expect them to use the term. The histories of the professionalization of designers are closely related to the industrialization of the practices they involve – interior design, graphic design, product design, for example – and these emergences are presently undertheorized.

25. Anna Müller and Frauke Möhlmann (eds), *New Exhibition Design 1900–2000* (Stuttgart: avedition, 2008), pp.216. Perhaps less successful is Uwe Reinhardt and Phillipp Teufel (eds) *New Exhibition Design Two* (Stuttgart: avedition, 2010), pp.408, which includes far fewer experimental, industrial, or independently generated projects – doubtless as a result of the short period it covers (2000 to 2010) and the difficulty of thinking reflexively about this more immediate past.

26. Kau-Uwe Hemken, “Textbook for the World: The 1930 International Hygiene Exhibition in Dresden,” in Müller and Möhlmann, *New Exhibition Design*, pp.122–8 (note 25); Anke Te Heesen, “‘Musée Sentimentale de Cologne’ by Daniel Spoerri and Marie Louise von Plessen,” in Müller and Möhlmann, *New Exhibition Design*, pp.164–78 (note 25).

27. Peter Wever, *Inside Le Corbusier’s Philips Pavilion: A Multimedial Space at the 1958 World’s Fair* (Rotterdam: nai010 Publishers, 2015).

electronic installation that would showcase in turn the innovation of their electronic consumer devices – and, in so doing, arguably spearheading together the electronic arts practices that would evolve into media art.<sup>28</sup> This demonstrates the “technology deploying technologies” of twentieth century exhibition practices, wherein innovations (of physics laboratories in this case) are put through their paces – often for the first time – in commercial contexts and public presentations. Le Corbusier’s chosen collaborators were the composer Edgar Varèse, and an extraordinary go-between in the person of Xenakis, whose work as both architect and composer would have significantly improved the chances of success of the enterprise.

Wever’s work as a researcher has uncovered a wealth of archival materials held in private hands, and significantly increases not only the understanding of the Philips pavilion itself but also of the research methodologies – technical, intellectual, and social – required to effect history of science *and* history of exhibitions concurrently. His work with Philips’ archival papers unearthed the corporate client’s secretive commissioning of a second pavilion as a risk management backup plan. He excavated links between Philips’ developing technologies and those techniques employed by Le Corbusier in the showcase exhibition, began to chart the intricate collaborative process of developing the *gesamtkunstwerk* exhibition, and outlined the significant role played by technicians in the daily operation of the pavilion’s *Poème Electronique*.

Looking outside canonical exhibition fields is also critical for the history of science – not all architects are as interested in exhibitions as was Le Corbusier, and clearly not all exhibitions are designed by those who identify themselves as professional exhibition designers. The meticulous and methodologically inventive work of Christian Vogel concerning the agency of display practices in the early years of the legitimation of X-ray technologies is a case in point. In his as-yet-unpublished 2015 doctoral thesis, he describes the coevolution of growing collections of X-ray plates and their embedded display in the clinic of Hamburg physician and Director Albers-Schönberg. Vogel demonstrates that Albers-Schönberg designed purpose-made window armatures to display X-ray plates in Hamburg’s purpose built clinic in 1919, employing natural light to render the plates visible both inside and outside of the clinic – thus conjoining research in comparative anatomy and seminar teaching structures with the public normalization of X-ray technologies.<sup>29</sup>

28. In Jean Petit (ed.), *Le Poème Électronique* (Paris: Les Editions de Minuit, 1958), pp.72, Le Corbusier states, “Je ne vous ferai pas un pavilion avec des façades. Je vous ferai un poème électronique et la bouteille qui le contiendra. Un poème ou pourrait participer toutes les techniques actuelles de l’électronique. Je ne vous ferai créer aucun instrument de physique nouveau, mais mettre en symphonie vos propres instruments.” “I will not create for you a pavilion of shop windows. I will make for you an electronic poem and the bottle to contain it. A poem in which all the current electronic technologies can participate. I will not ask you to devise any new physics instruments, but rather I will orchestrate a symphony of your existent instruments.” Translation by the author.

29. Christian Vogel, “Exponierte Wissenschaft. Röntgenausstellungen als Orte der Wissensproduktion und -kommunikation, 1896-1934” (unpublished doctoral dissertation, Humboldt-Universität zu Berlin, 2015). See also Christian Vogel, “Das »Gesamtgebiet der normalen und pathologischen Röntgen- anatomie« ausstellen. Sammlungswissen und radiologische Arbeitspraxis im »Museum« des Hamburger Röntgenhauses 1914/15,” in Anke te Heesen and Margarete Vöhringer (eds), *Wissenschaft im Museum – Ausstellung im Labor* (Berlin: Kadmos, 2014), pp.37–63.

## Exhibition design: A complex process

Regardless of the subject of an exhibition or of the status of its designer, there are core processes and activities to exhibition design of the twentieth and twenty-first centuries: all of them are essential components in the production of meaning and therefore must be of the utmost interest to historians. Designers conceptualize and materially orchestrate the deployment of multidimensional and multimedia elements in space with a view to communicating knowledge and to dynamically inducing a subjective experience likely to form a correlative conceptual understanding in the imagined visitor. They variously originate exhibitions themselves, or collaborate with colleagues, or respond to design briefs outlined by clients. Those clients can be corporate, governmental, institutional, and/or individual. Already one can see the complexity of the position of designer and how crucial it is for historians of science and technology to understand the agency of the designer.

Working between the constraints of both budget and spatial parameters, designers analyze the client brief and the list of requirements and/or exhibition objects, and their work structures the visitors' experiences. This structuring is effected through their knowledge of display technologies, material qualities and capacities (glass, plastics, wood, metal, etc.), of cognitive processes, of architecture and architectonics, of the subject matter of the exhibition, and of the client's needs and foibles. Among the elements and techniques at the disposition of the designer are light, scale, color, surfaces, textures, electronics, audiovisual media, graphics and more.

The client brief can be long or short, political or prosaic, informative or near useless. The designer must work out the optimal conceptual structure to convey the ideas and aspirations that are outlined in the brief, as well as ensuring that this optimal structure can be created within the budget and time allotted. He or she must plan both the cash flow and the workplan to materialize the concept, and convince the client that the proposed concept is the best and most feasible one, using drawings, floor plans, models, visualizations, mood boards, flythroughs, glossy one-off project publications, and any means necessary and affordable.

The designer must commission, budget, negotiate, oversee, and manage the timely delivery of all the bespoke manufactured display elements of the exhibition, which often involves dozens of craftspeople working in a range of different materials and media, all with their own timeframes and processes that must be centrally coordinated. Each display element must be meticulously specified to fit both the exactly measured objects on display and the larger scale volumetric space in which the elements are disposed. Exhibition design also involves two-dimensional practices with texts, typography, signage, image use, and reproduction, and the designer must act as go-between, bringing together those who are writing exhibition texts and the graphic design process, integrating this last into a coherent, structural esthetic whole with the final spatial design.

If there are objects chosen – from museum collections, or industrial products, or consumer goods, or art galleries – the designer must ensure that these valuable materials come into the display installation process at exactly the right moment. Not too early, when they might be damaged by the dusty or dirty construction and decoration processes, and not too late, when they could threaten to push back the exhibition opening date. This is no easy task when those objects may be institutional or corporate loans, or

industrial prototypes made expressly for the event, or objects requiring cleaning and conservation before they are displayed.

Each and every one of these constellations of events and materials in space and time are subject to unique conditions and lead to esthetic decisions that are productive of specific communications and understandings in the final exhibition. Analyzing these kinds of events lies at the very heart of any serious history of knowledge in the near present, and is the work of historians of science and technology. Often, little archival evidence remains of the complex process of knowledge production and communication represented by exhibition design and production. Where can we look for it and what might it look like?

As we have seen with Schroeder-Gudhus and Rasmussen, the range of governmental, institutional, corporate, and individual archival holdings must be examined. For most universal trade exhibitions, there will be a list of credits and a set of financial accounts, and this is where one would begin to enumerate the possible sources of design, technology, and media archives.

Corporate and individual archives, often still in private hands, are much more difficult to access, as is the case for other research areas in the histories of the sciences and technology. For exhibition designers, who have often in the twentieth century been sole traders with smaller offices and leaner administrative infrastructures, the creation of a structured archive would have been an expense not always or even often deemed necessary, and papers may still be unordered and in private hands. The huge disruptions of war and civil strife in the twentieth century mean that there exists a diaspora of archival deposits for many significant design creatives strewn across Europe and the Americas.<sup>30</sup>

## **Designers: Reluctant archivists**

Exhibition designers who are also often either architects or designers in other media may have had a profile that means that they are well known and their archives comparatively well cared for, generally with finding aids available if not fully catalogued – whether in public or private hands. The best known of these who also worked internationally are Herbert Bayer, Will Burtin, Le Corbusier, Charles and Ray Eames, Walter Gropius, Friedrich Kiesler, El Lissitzky, Jack Masey, Herbert Matter, László Moholy-Nagy, Mies van der Rohe and Lilly Reich, and Walter Dorwin Teague. Almost all of them effected significant exhibition and communication design in the fields of science, technology, and industry – either for corporations or for nation-states. Some were engaged in the entire manufacturing and communication chain: for example, Teague designed cameras as well as retail spaces and trade fair exhibitions for Kodak from the late 1920s until his death in 1977.

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30. The tireless work of design historian R. Roger Remington in consolidating and preserving the archives of designers who have worked in the United States of America means that the papers of a significant number of designers who were exiled from Europe during the Second World War are now to be found in the Vignelli Center for Design Studies at the College of Imaging Arts and Sciences, Rochester Institute of Technology: <<https://www.rit.edu/facilities/vignelli-center-design-studies>> (July 15, 2019) and <<http://library.rit.edu/cary/collections>> (June 3, 2018).

What may be found in the papers of these and other designers will range from administrative documents to visual materials of all shapes and sizes, and one can expect to encounter:

- Design briefs, describing at the outset the aims and aspirations of the client – these can contain financial and spatial contexts and constraints as well as ideational expressions, and can be authored by client, designer, or both
- Visual and textual documents relating to the conceptualization process – often extremely rich and not always chronologically ordered unless it is in a bound notebook
- Correspondence with the client during the conceptualization process, seeking clarifications – often also subtextually a negotiation process in relation to ideas as well as budgets and fees
- Formal project proposals or “pitches,” describing how the designer has conceptualized and resolved the needs of the client – including texts, one-off publications, slideshow presentation scripts, and a range of visual materials such as working sketches, visualizations to scale, models, mockups, final artworks for photography (mechanicals), and photographic transparencies as 35mm slides (for slideshow presentations)
- Correspondence with the clients and private memos and notes to collaborators concerning project development and financing following the acceptance of the project – cross-analysis of which may reveal important conflicts
- Research correspondence and private notes relating to the commissioning of all elements of the exhibition from collaborators and suppliers – as above
- Correspondence and private notes relating to specifications of the exhibition location and its constraints, logistical information such as shipping and insurance – as above
- Texts as written and edited for inclusion in the exhibition – the exhibition designer can often have a deep influence on this aspect, and at the very least has to consider it spatially and in collaboration with graphic design colleagues
- Smaller materials and hardware such as textile swatches, light gels, and fittings that may or may not have been used in the final exhibitions
- Larger materials that may be *either* prototypes for the exhibition fitout *or* remnants of the exhibition after its demolition – differences that may be crucial to understanding the exhibition
- Diaries with significant dates and meetings – often important to check against official accounts of events
- Address books, including “Rolodex” cards and other forms of information management – significant for understanding the professional contacts and contexts of the working designer, and a gift to any researcher particularly interested in actor networks
- Photography in all formats and conditions: contact sheets, individual black and white prints, 35mm slides, 4 ¼ color transparencies – some of which will have been taken and used during the research and development process, some for the client presentation, some in preparation for the exhibition displays themselves (in

a range of reproduction techniques such as diazotype, bluelines, photostats, polaroids, etc., all relatively fragile chemically and in relation to light exposure), some taken as records for technicians especially in the case of traveling exhibitions, some for publicity and marketing: parsing these use and function differences is both crucial and painstaking work<sup>31</sup>

These materials echo the project management critical path that I have elaborated in the section *Exhibition design: A complex process*, and the activities that can be identified by these material traces also form guidelines for a more practice-based approach, which would involve the history of science researcher in actually making an exhibition, the advantages of which I outline in the section *Practice-based research*.

Beyond the archives of designers, the working papers of photographers can also be an important source; their images of course, but also their financial records and correspondence. Of particular interest will be contact sheets that can be analyzed chronologically to understand sequences of events in the exhibition production process, and also the ways in which certain images are later recontextualized and reframed to meet the exhibition aims.

Press photography can be found not only in state and corporate publishing and broadcasting archives, but also in the holdings of independent photographic agencies whose business model was based on hiring photographers to shoot newsworthy events and then licensing the syndicalized photographs for newspaper publication internationally. Some of these agencies are still functioning (Magnum), others have been subsumed into stock photography companies (Getty Images), and still others have found their way into publicly accessible archival deposits (Black Star, Ryerson Image Centre). The press, radio, and television archives are also important sources for researching exhibitions and understanding their design, layout, and communication effects.

The skills of archival research are not foreign to historians, though the specific skills of researching the visual and material culture of the latter twentieth century – a period of intense technological change and multiplying mediatizations – requires training. What may be less familiar as a method for historians of science is the practice of the phenomena they study: the *making* of exhibitions as a way of *understanding* exhibition histories as well as being a way of “doing history.”

## Practice-based research

In recent years, historians of science in France and Germany have also begun to practice as exhibition curators and producers, starting with Jean Clair (*L'ame au coeur*, 1993) and Bruno Latour (*Making Things Public: Atmospheres of Democracy*, 2005) for example, and including Anke te Heesen (*Auf/Zu: Der schrank in den Wissenschaften*, 2007), Charlotte Bigg (*Atombilder: Ikonographie des Atoms in Wissenschaft und*

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31. There are as yet few terms that have been developed for controlled vocabularies such as the Getty Art and Architecture Thesaurus or ISAD(G) standards of the International Council on Archives that address the accurate description of graphic and exhibition design archival materials. Care in the identification by the researcher of the original intention and actual use function of these materials is important to any epistemological project concerning histories of exhibitions.

*Offentlichkeit des 20. Jahrhunderts*, 2007), and Jochen Hennig (*Atombilder*, 2007 with Charlotte Bigg and, with other Berlin-based colleagues, *Weltwissen: 300 Jahre Wissenschaftern in Berlin*, 2010).

This hands-on experience of exhibition-making in the present gives deep insights into avenues to pursue in historical-epistemological terms when attending to exhibitions of the recent past. Going beyond the reconstruction and reenactment approaches of some recent histories of science and technology, such projects involve the creation of new exhibitions using contemporary skills, capacities, and professional collaborations as well as humanities methods. In this way, innovations in historiography are effected in the very practice of exhibition-making, and the practice-based experience in turn enriches the understanding of exhibition histories.

What does it take to make an exhibition?

Those who have never made a museum exhibition would find it hard to imagine the complexity of the process in sheer logistical terms. Imagine how much greater the frustration of obtaining picture rights for a publication would be if you were, instead, trying to get not the image, but the actual object, delivered to your office door. ... It is a time-consuming, detail-dependent business, not for the faint hearted.<sup>32</sup>

In my contribution to the conference “The Exhibition as Product and Generator of Scholarship” (Deutsches Museum, Munich, 2008), I outlined the major workflows toward the production of an exhibition. Object research is a primary activity, and should take place in a range of contexts, collections, and museums. These objects will all have related documentation and metadata that will be fundamental to your research, often held in cataloguing structures and leading to other primary sources such as acquisitions files. Objects must also be managed – locating and selecting them as well as negotiating their loan to the exhibition, including conservation and condition work; shipping, crating, and insurance; preparation to receive and handle them at the exhibition site. Design work will be large scale in terms of effectively meshing concepts and esthetics, and then become highly detailed in terms of capturing accurate object dimensions, weights, and materials, in order to specify appropriate display units. Scheduling and timing the manufacture and delivery of the design elements and display units is a major task, as well as budgetary management. Managing collaborative teams is another major workflow: scholarly colleagues and creative colleagues as well as assistants and museum collections management, conservation, registration, and installation teams all need to be coordinated. Different kinds of text productions – catalogues, leaflets, panel texts, object lists, and website content – will all be required and requested. Finally, liaison and collaboration with the education departments of your host institution, with marketing, and with the press office are also critical and time-consuming activities.

While making an exhibition, the constraints and exigencies of the form are revealed, and one gets a visceral, lived sense of the huge political, social, logistical, intellectual, and economic pressures that operate on exhibitions. In short, one learns where to look in the future for the sublimated hegemonies in exhibitions made by others, and by

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32. Lehmann-Brauns, Sichau, and Trischler, “Thinking through Objects,” in Lehmann-Brauns, Sichau, and Trischler (eds), *The Exhibition as a Product and Generator of Scholarship*, p.39 (note 7).



**Figure 4.** Film still from Fischli Weiss, *Der Lauf der Dinge*: color video, 30 minutes (1987)  
© Peter Fischli and David Weiss, Courtesy Matthew Marks Gallery.

implication how to effect deep exhibition histories. With such practice-based research, the complex syntax of things in context becomes for the historian of science a new analytical language for visual, spatial, and temporal exegesis.

### **Coda: Artist as historian of science**

In beginning this paper with what I called a micro case study focusing on two individuals located on either side of the production/reception divide of the Swiss Pavilion of the 1964 Triennale de Milan, I wished to propose the legitimacy of individual subjective experience as an historical fact worthy of attention. Phenomenology of cultural forms such as exhibitions cannot be dismissed merely because its innumerable singularities cannot be aggregated into general claims. Instead, we can seek to track and analyze the evolutions of subjective experiences of exhibitions in the esthetic shifts and iterative genealogies of the very making of exhibitions. This will require us – eventually – to epistemologize the relationship between experiencing exhibitions and making them.

Among the other unexpected and tangential legacies of Fischli's prescient 1960s analysis of leisure time and the spatialization of alienation is without doubt the magisterial 1987 film *Der Lauf der Dinge* created by Hans Fischli's son, Peter Fischli, and his artistic collaborator David Weiss.<sup>33</sup> The film follows a series of kinetic contraptions in an extended and hilarious chain reaction created from everyday objects such as shoes, tables, kettles, tires, and pools of oil on a concrete floor – a number of them exactly the sort of time-saving device that ostensibly produces leisure time (Figure 4).

The lo-fi camera captures the 30-meter-long sequence (“a bottle-filling machine?”) as the domestic objects burn, steam, roll, and tumble each other into a depressive oblivion, exposing the anomie and the irony at the heart of all causal descriptions of the world.

33. Fischli Weiss, *Der Lauf der Dinge*: color video, 30 minutes (1987).

Here, finally, are all the labor saving devices that were absented from the 1964 Swiss Pavilion at the Milan Triennale, come back to haunt a western world that irrevocably entered economic globalization in the 1970s. Fischli *films* and his collaborator Weiss devised a slapstick spectacle of their last gasp with their 1987 film, demonstrating pyrotechnically the way in which such technologies consume even themselves. To me, this too is an object lesson in the historiography of science and technology, at once as rigorous as it is open to the world: a “hybrid heuristics” producing elements of “an epistemology from below,” as Hans-Jörg Rheinberger has proposed.<sup>34</sup>

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34. Hans-Jörg Rheinberger, “Epistemics and Aesthetics of Experimentation: Towards a Hybrid Heuristics?” in Philippe Sormani, Guelfo Carbone, and Priska Gisler (eds), *Practicing Art/ Science Experiments in an Emerging Field* (London: Routledge, 2018), pp.236–48.