

Festschrift: how do we value artefacts in museum research?

Journal ISSN number: 2054-5770

This article was written by [Helmut Trischler](#)

04-08-2020 Cite as 10.15180; 201310 Discussion

[Festschrift: how do we value artefacts in museum research?](#)

Published in [Spring 2020, Issue 13](#)

Article DOI: <http://dx.doi.org/10.15180/201310>



Abstract

Museums of science and technology are well known for their efforts in collecting, preserving and exhibiting material expressions of techno-scientific cultures. Often, however, they have been struggling with their task in advancing historical knowledge production based on object-oriented research. This paper explores the eminent role of Robert Bud, longstanding curator and sometime head of research at the Science Museum in London and dedicated scholar in academic research and teaching, to find new ways to value artefacts in museum research. This reflection looks back on more than a quarter century of personal encounters in order to trace, first his stimulating efforts to develop innovative research questions that interrogate the epistemic quality of artefacts and, second, his enduring impact in fostering international research collaborations and networks.

Component DOI: <http://dx.doi.org/10.15180/201310/001>

Keywords

Robert Bud, artefacts, museum of science and technology, public technology, collaborative research, Science Museum, Deutsches Museum, Tensions of Europe

Introduction

The last three decades or so have seen numerous efforts, concepts, approaches and ideas of how to value artefacts in research and teaching, scholarship and public dissemination of science and technology. The renewed interest in museum objects coincided with the emergence of the material turn^[1] in the early to mid-1990s, and it literally materialised in the founding of the research network Artefacts within the very same time frame. Although the task of making scholarly sense of their collections

is one of their foremost objectives, museums of science and technology were for a long time rather quiet in this regard. Not that museum curators didn't complain about a lack of professional interest in studying their collections. Often, artefacts were understood to speak for themselves, rather than as objects that allow for generating rich stories about both techno-scientific and cultural change. As Martin Collins has argued, for 'traditional anthropology and material culture studies, the artefact has long been an *entrée* into exploring the meanings and practices associated with particular cultures. Artefacts may illuminate a culture through the details of their creation and use (materials, craft skills, exchanges, rituals) as well as through their associated symbolism' (Collins, 2005: 1). In the field of history of science and technology, however, it needed a kind of wake up call by academic scholars to turn museum artefacts into 'things that talk' (Daston, 2004). And it is not by coincidence that as eminent an historian of science and technology as Robert Fox has never become tired of stressing the importance of combining in-depth studies on specific artefacts with multi-perspectival approaches of historical contextualisation (Fox, 1990; Fox, 1998; Fox, 2007).

Following similar lines of reasoning, both historians of science and technology and scholars in science and technology studies have shown that concepts which focus on the use of material artefacts allow us to de-centre the conventional emphasis on invention, innovation, progress and technology. Use-oriented stories stress 'things in use, and the uses of things', processes of imitating and replicating, the long life of things in use, the 'shock of the old', to quote David Edgerton's influential book on cultures of transforming technologies by active consumption (Edgerton, 2006). In their effort to revisit the history of Europe, Ruth Oldenziel and Mikael Hård have gone even further by staging consumers and tinkerers as 'the people who shaped Europe' (Oldenziel and Hård, 2013). In short: artefacts as embodiments of technological cultures have gained high visibility in both academic and museum research.

How have museums of science and technology responded to the growing academic interest in their collections? How have museum professionals with pertinent experience in academic scholarship as well as in curatorial affairs contributed to the formation of such new research agendas both inside and outside the walls of their respective institutions? In the following paper, I shall look back on more than a quarter-century of numerous encounters and collaborations with Robert Bud to provide answers to these questions – subjective answers of course, which are biased by my specific personal experiences and world views. I am convinced, however, that there is hardly a person better suited to focus on than Robert, both longstanding curator and sometime head of research at the Science Museum and dedicated scholar in academic research and teaching, to get answers to these questions.

Artefacts – the network

As I recall, the idea of launching a network of artefacts-based research, in short Artefacts, gained momentum on 21 October, 1995 when the 38th annual meeting of the Society for the History of Technology (SHOT) was held jointly with the annual meeting of the Society for the Social Studies of Science (4S) in Charlottesville at the University of Virginia. At that conference, I had just finished the session 'Planned Mobility: Political Transport Concepts in the 20th Century', which I had organised and chaired, when Bernhard Finn, curator of electrical collections at the National Museum of American History of the Smithsonian Institution in Washington DC, and Robert, back then curator of biosciences and head of life and communication technologies at the Science Museum in London, confronted me with a plan they had discussed since 1993: that the National Museum of American History, the Science Museum, and the Deutsches Museum, i.e. three of the world's greatest repositories of material heritage and the strongest museums in the field of science and technology, should join forces to develop research programmes and debates on how to value museum collections. A first meeting in connection with SHOT's next annual meeting at the Science Museum in London, which was scheduled for 1–4 August 1996, would bring together scholars from museums, universities and independent research institutions to explore new avenues in object-oriented historiography of science and technology.

This idea perfectly fitted my own agenda to further develop the Deutsches Museum, Germany's national museum of science and technology and a *Forschungsmuseum* (research museum) by legal statute, as a both nationally and internationally leading institution for research on material culture. I enthusiastically responded and was strongly backed by both the Museum's Director-General and the scientific advisory board. Hence, Deutsches Museum became one of the drivers of Artefacts, the newly established research network, which held its first meeting in London on 30–31 July 1996. Thanks to Robert's skilful organisation and intellectual leadership, the meeting was immensely productive. Focused on the theme of medicine and health, it explored innovative concepts and approaches in using objects to research and communicate the history of techno-scientific cultures. In

a joint effort of scholars from museums and academia, it also vividly evaluated the new permanent gallery *Health Matters*, which had opened at the Science Museum in 1994.

Figure 1



© Science Museum/Science & Society Picture Library

The *Health Matters* gallery opened at the Science Museum in 1994

DOI: <http://dx.doi.org/10.15180/201310/006>

Most important, however, was the consensus of all participants and museum stakeholders that such meetings should be continued and its results should be published. It was agreed that the next two meetings should be organised by the other two leaders of the Artefacts consortium, the National Museum of American History in Washington DC and the Deutsches Museum in Munich, and in doing so providing a momentum to the emerging network on studies on the material culture of science and technology. Thanks to Robert's leadership, the Science Museum volunteered to serve as the publishing arm of Artefacts. The Museum's publication department took over and managed to strike a contract with Harwood Academic Publishers. Volume 1 of

the new series, which was named *Artefacts: Studies in the History of Science and Technology*, published the results of the London meeting and its title 'Manifesting Medicine' created a pattern of using alliterative titles that quickly developed into a signifying marker of the series ([Bud, Finn and Trischler, 1999](#)). Neither this volume nor any other books of the series that followed, however, were mere 'proceedings' of the Artefacts annual conferences. Rather, the meetings helped to explore if a chosen topic deserved treatment at length in a volume. With volume 7 of the series, the Smithsonian Institution Scholarly Press took over and since then has been in charge of publishing the output of the Artefacts network. Thanks to the splendid work of Martin Collins, curator of the civilian applications satellites collection of Smithsonian's National Air and Space Museum, as managing editor, the series has further gained in quality and with volume 11, which challenges the role of museum collections in the twenty-first century, it has developed into an open access series.[\[2\]](#)

Figure 2



Material Culture and Electronic Sound

Edited by Frode Weium and Tim Boon

WITH A FOREWORD BY BRIAN ENO

artefacts
STUDIES IN THE HISTORY OF
SCIENCE AND TECHNOLOGY

© Science Museum/Science & Society Picture Library

Artefacts: studies in the history of science and technology, 'Material Culture and Electronic Sound' edition

DOI: <http://dx.doi.org/10.15180/201310/007>

Following the meeting in London, a continuing series of 23 annual Artefacts conferences thus far held has spread across the world, stretching from Vienna to Oslo and from Ottawa to Philadelphia. Robert has participated in all of them, except the one in 2018 (splendidly organised by the Adler Planetarium in Chicago), when he was unfortunately hindered by health problems. In the community, he is widely recognised for his reputation as a most engaged discussant, whose scholarly creativity and intellectual versatility contributed greatly to the stimulating working culture of Artefacts.

Not all of the high-flying goals that the individual and institutional founders had in mind when setting up Artefacts in the mid-1990s have been fully achieved thus far. The objective to collectively create patterns of elaborated peer reviewing of exhibitions, for example, is still pending, to be honest, despite the efforts of a number of journals in the field of history of science and technology. SHOT's flagship *Technology & Culture* has recently published a couple of excellent exhibition reviews such as the ones on special exhibitions at the Science Museum and the Deutsches Museum by Johannes-Geert Hagmann (2014) and Finn Arne Jørgensen and Dolly Jørgensen (2016). Such fine-grained and detailed reviews can serve as role models for an in-depth evaluation of museum exhibitions as products and generators of scholarship.

The goal, however, to profile Artefacts as a forum to discuss the scholarly status and value of exhibitions as scientific enterprises has always been high up on the agenda. Hence, it doesn't come as a surprise that it was Robert who gave the keynote speech when in 2008 the Deutsches Museum, jointly with the Max Planck Institute for the History of Science, held a conference with exactly that target: to rethink collecting and exhibiting as scholarly enterprises (Bud, 2010). Robert and I have always been brothers in spirit to ensure an indissoluble bond between researching, collecting and exhibiting in museums of science and technology in the sense that research generates exhibitions which in turn generate research. Moreover, we both share the deep conviction that exhibitions not only visualise results of scholarly works, but produce new knowledge by posing innovative research questions that interrogate the epistemic quality of artefacts.

Component DOI: <http://dx.doi.org/10.15180/201310/002>

Techno-scientific collaboration

One of the strengths of Artefacts is its informal character which stimulates intellectual openness, if not thought provocations, in an atmosphere of academic collegiality. Rather than a formal institution, Artefacts resembles an informal network that allows for flexible responses to professional challenges. Artefacts has always been a kind of sanctuary for museum specialists to openly exchange information on issues in a structured but still informal setting. Moreover, Artefacts has developed into an enabling platform for research collaborations.

As shown elsewhere, Europe has experienced a long history of border-crossing collaborations in science and technology (Kohlrausch and Trischler, 2014). Museums have been key to the formation of a transnational culture of the techno-scientific expertise. One could even go so far as to say that it was the Science Museum's institutional precursor, the Great Exhibition of 1851 at the Crystal Palace, from which all the museums at South Kensington later emerged, that laid the foundation of a culture of transnational collaboration. With the Great Exhibition 'the long and intricate process of sharing knowledge began in earnest, on an international scale'; the Crystal Palace served as the prototype of a forum 'in which experts could meet and discuss current issues of transnational significance' (Kohlrausch and Trischler, 2014: 3). In response to the experience of two cruel world wars, Europe in the second half of the twentieth century experienced a process of political and economic integration. It is often overlooked, however, that Europe has been intensively shaped also by the circulation of people, their experiences and knowledge, and materials – a culture of exchanging expertise well grounded in the 1851 exposition.

Since the late 1960s then, numerous programmes to foster transnational collaborations in science and technology have been launched, from the Cooperation in Science and Technology (COST) in 1970 and the European Science Foundation in 1974 to the Maastricht Treaty of 1993 which has empowered the European Commission with all the means to activate the integral forces of research in Europe.

At the turn to the twenty-first century, the long tradition of techno-scientific collaboration gained high visibility. In 1999, European leaders met in Bologna to agree on joint standards for academic education. The Bologna declaration ensured comparability in the standards and quality of higher education credentials thus enhancing cross-national student mobility. A couple of months later, in March 2000, Lisbon hosted a special meeting of the European Council to create a new vision for Europe. The goal was to turn Europe into a fully integrated space of knowledge production, the 'European Research Area' or 'European Knowledge Society'. The Lisbon Agenda, as it came to be known, aimed at developing Europe into 'the most dynamic and competitive knowledge-based economy in the world' and to 'shift to a digital, knowledge-based economy'.^[3]

At the very same time, a group of historians of science and technology began to critically question this technocratic vision of a European Knowledge Society by studying its historical roots, contingencies and, not the least, contestations. After a foundational gathering at the Technical University of Eindhoven the research network Tensions of Europe was born to explore the long and winding history of the continent's 'hidden integration' that emanated from the circulation of people, ideas and goods ([Misa and Schot, 2005](#)). The network's agenda turned out to be intellectually highly stimulating and rewarding. Numerous publications appeared, including the six-volume series *Making Europe: Technology and Transformations, 1850–2000* with Palgrave Macmillan, which received the Freeman Award in 2014.[\[4\]](#)

Robert Bud was present at the inaugural meeting in Eindhoven and he became one of the drivers of Tensions of Europe. His impact on shaping the network's research agenda can't be overestimated. His true collegiality and personal empathy strongly contributed to keeping the network together, to ensuring the highest possible quality of its scholarly products, and also to training a new generation of early stage researchers with a particular emphasis on including students from Eastern Europe. In addition, Robert was instrumental in creating innovative tools to use the research results of the network and the collections of the museums involved both for academic teaching and public dissemination in interactive website projects. The website *Inventing Europe – European Digital Science & Technology Museum* in particular allowed users of all kinds to explore the stories behind artefacts, photos and videos to learn how technology has shaped Europe and Europe has shaped technology.[\[5\]](#)

Figure 3

6 EXHIBITIONS 40 TOURS 1000+ OBJECTS ABOUT EDUCATION MYEUROPE

INVENTING EUROPE

EUROPEAN DIGITAL MUSEUM FOR SCIENCE & TECHNOLOGY

TAKE A NEW LOOK AT EUROPE'S HISTORY

For centuries, science and technology have both crossed and created borders in Europe. Come explore the stories behind objects, photos and videos to discover how technology has shaped Europe - and Europe has shaped technology. Take a tour through one of our six exhibitions, or go on a special guided tour by one of our guest curators.

EXHIBITIONS

- DAILY LIVES EXHIBITION
- INFRASTRUCTURES EXHIBITION
- GOVERNANCE EXHIBITION
- MEDIA EXHIBITION
- GLOBALISATION EXHIBITION
- KNOWLEDGE SOCIETIES

GUEST CURATOR TOURS

- IN TANDEM INNOVATION BY FRANK VERAART
- X-RAY WINNER OF WWI BY AD MAAS

PARTNERS

Inventing Europe: European Digital Museum for Science & Technology – <http://www.inventingeurope.eu/>

DOI: <http://dx.doi.org/10.15180/201310/008>

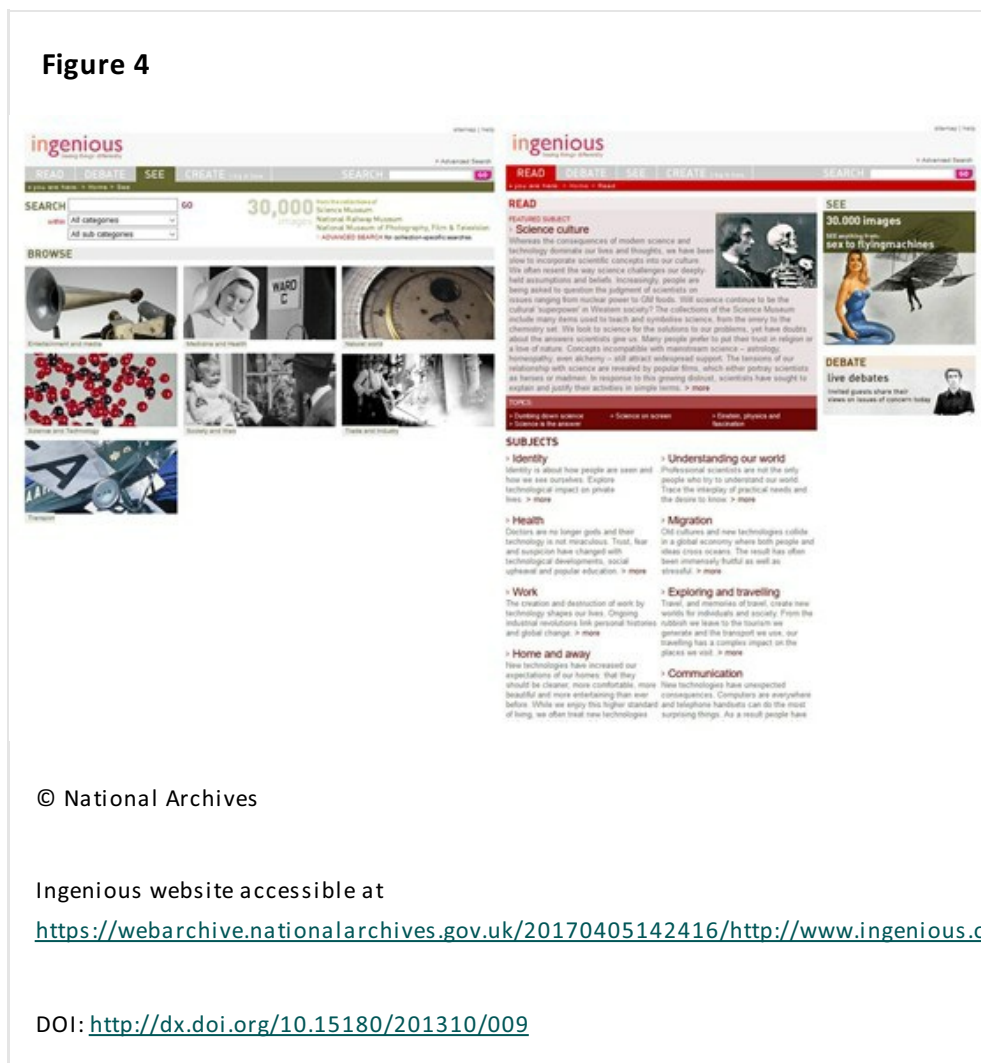
As well as discovering six digital exhibitions and guided tours by guest curators, users have the opportunity to create their own tours navigating Europe's longstanding traditions in border crossing circulations of techno-scientific experts and knowledge. Thanks to Robert's experience, creativity and intellectual leadership, such novel and widely frequented applications of the young but rapidly growing fields of Digital Humanities and Digital History have come into existence – another case in point of how to value artefacts in research and teaching.

It should be emphasised that Robert not only actively contributed to the study of process of cross-national collaboration, he has also practiced it on many levels and in many instances. Well beyond the aforementioned flagship cases Artefacts and Tensions of Europe, he participated in, and oftentimes initiated, numerous inter-institutional collaborative projects. Not all of them were successful in the sense of getting funded in the highly competitive environment of European Union sponsored programmes. All of them, however, left a distinctive mark on the shaping of the scholarly agendas of museums and beyond.

Two examples are worth mentioning here. They help to emphasise Robert's immensely important role in digitising museum collections and making them openly accessible. The first one, named *Digital Initiative in Scientific Heritage for Europeana and*

Society (DISHES), brought together no less than ten European museums of science and technology, including the Science Museum and the Deutsches Museum, and it was Robert who convinced the British-based Collections Trust to take the co-ordinating lead. DISHES, first, aimed at digitising ten-thousand objects and photographs and hundreds of thousands of pages of printed and archive material texts and, in doing so, at developing common metadata structures, innovative mapping tools and generic methods of making cultural heritage openly accessible. Second, to assure richness, diversity and integrity of the individual items of the digitised content, a two-level framework of themes and stories was developed. Here, DISHES very much profited from Robert's rich experiences in using the concept of storytelling to advance the 'public understanding of science', which he had publicised both in a couple of scholarly articles ([Bud, 1993](#); [Bud, 1995](#)) and in highly innovative and successful website projects of the Science Museum such as *Making the Modern World* and *Ingenious*.

Figure 4



© National Archives

Ingenious website accessible at

<https://webarchive.nationalarchives.gov.uk/20170405142416/http://www.ingenious.org.uk/>

DOI: <http://dx.doi.org/10.15180/201310/009>

The set of themes was chosen to structure the collections to be digitised along relevant questions related both to historical inquiry and current problems of society, embedding the collections into broader societal contexts, and providing thematic links between the collections of the museums involved. Third, DISHES was targeted to experiment with tools for users to generate content by themselves; here it served as a pilot for the aforementioned website project *Inventing Europe*.

DISHES aimed at grounding the high-flying vision of a European Knowledge Society on the material base of Europe's interconnected collections of cultural heritage. The second example, *European Scientific and Technological HERitage* (ESTHER), pointed in the same direction with an even more ambitious agenda. The consortium of six major museums of science and technology and the Foundation for the History of Technology, led by the Deutsches Museum, envisioned ESTHER to anchor the technoscientific cultural heritage in the public sphere through critical reflection of the collective European technoscientific achievements after the Second World War and thereby contribute to the further evolution of a European identity. To accomplish this mission, the project was designed to develop and establish a robust methodology for the identification and description of a 'born European' technoscientific cultural heritage. Work flows to collect, safeguard and openly access objects resulting from European-wide funded research institutions such as the European Space Agency (ESA), CERN or the European Molecular Biology Laboratory (EMBL) were to be developed and tested in order to disseminate the validated methodology amongst cultural

heritage professionals and thus to ensure its pan-European application in science and technology museums, universities and private collections.

Neither initiative succeeded in being funded, but the experiences gained to creatively conceptualise such novel approaches in the realm of cultural heritage have fallen on fertile grounds and helped to foster numerous follow-up projects both on the national and trans-national level. Today, in times of growing nationalism and populism – and Brexit even – it is of invaluable importance to mobilise Europe’s longstanding traditions in trans-national collaboration, the hidden integration that results from the circulation of knowledge, and to showcase affirmative stories of overcoming short-sighted nationalism through techno-scientific internationalism. In his work and personality, Robert has always been a shining archetype for a truly international scholar who has worked tirelessly to mobilise the full potential of transnational history to overcome narrowmindedness and provincialism. I do remember countless meetings in Munich and London, Paris and Stockholm, Florence and Oslo, Washington DC and Singapore, where we sat together for hours and hours to think about the value of artefacts in research. Thanks to Robert’s creativity paired with serendipity and hard labour, we often found novel answers that aimed at stimulating both academic research and teaching and public dissemination of knowledge.

Component DOI: <http://dx.doi.org/10.15180/201310/003>

Public technology

An exemplary case of such a novel answer, the most recent one in the record of our longstanding collaboration, is the concept of *public technology*, jointly developed by Robert and myself in a highly beneficial process of collaborative thinking and writing (Trischler and Bud, 2018). This concept has resulted from the project *History of Nuclear Energy and Society* (HoNESt), an offspring of the transnational scholarly networks *Artefacts and Tensions of Europe*. HoNESt, generously funded by Euratom, has brought together an interdisciplinary team of experts in nuclear history from no fewer than 23 research institutions, including the Science Museum and the Deutsches Museum, with the objective of understanding how societies have engaged with nuclear energy, and how the nuclear energy sector has engaged with societies, and how this has changed over the course of the past sixty years.[6] In a multi-tiered approach, HoNESt has firstly produced twenty so-called *Short Country Reports*, including one on Great Britain by Robert and his collaborator Stuart Butler.[7] Based on the rich material gathered in the process of generating these extended reports the team of experts has secondly sought new concepts to analyse and narrate Europe’s complex and diverse encounters with civil nuclear energy.

Figure 5



© Dounreay

The control room at Dounreay Nuclear Power Station, which was acquired by the Science Museum

DOI: <http://dx.doi.org/10.15180/201310/010>

In a brainstorming meeting in Brussels, I came up with the idea of understanding (civil) nuclear energy as a public technology,

and it was Robert who instantly recognised the wider potential of this idea in order to get a better understanding of the role of publics in co-shaping technologies. The concept of public technology focuses attention on processes of active consumption, creative appropriation and visionary imagination of things. However, it goes further in its objective to come to a deeper understanding of technologies as culturally created entities and to properly situating them in society. The concept highlights processes of discursive formation and trans-formation of technologies and it aims at tracing the formative power of publics down to the level of concrete decisions in engineering. Robert rightly pointed to the fact that the late nineteenth and the twentieth century saw many more cases of emerging technologies shaped by the public, such as the Zeppelin and poison gas, and radio and television, to name but a few exemplary cases of public technologies. It has not escaped the notice of Robert and myself, both working in museums of science and technology, 'that the approach to understand cultural trajectories of public technologies is particularly significant for museum-related interpretations of temporal change. Hence, we present a history to which the museum's lay clientele and its ancestors have not been passive onlookers to the "real" history which they could only admire – or resent. Instead, we portray public personae as active participants in the cultural shaping of technology' ([Trischler and Bud, 2018: 208](#)). And often, it has been museums of science and technology with their collections and exhibitions that have enabled the public to better understand and co-shape technologies. As the two of us, jointly with Stathis Arapostathis, have shown in another publication, nuclear energy is an exemplary case here, not incidentally staging both the Science Museum and the Deutsches Museum as powerful agents particularly during the 1950s, the emergent period of nuclear energy ([Arapostathis, Bud and Trischler, 2019](#)).

Component DOI: <http://dx.doi.org/10.15180/201310/004>

Conclusion

The questions of how scholars value the rich collections of museums of science and technology in their research and teaching, and how they utilise artefacts as an epistemic resource to develop new stories much richer in both their narrative and explanatory power than conventional historiography provides has kept Robert Bud busy from the beginning of his career as a museum curator in the 1980s up until today. He has been a long-standing advocate for object-based scholarship and started to reflect on the potential of exhibits to narrate stories rich in content and context, long before various turns, from the material culture turn to the practical turn and digital turn, have transformed the humanities. In the early 1990s already, he raised the conceptual question of how curators could creatively make use of the often powerful myths embedded in exhibits, 'which would facilitate the resolution of conflict engendered by science's threat to traditional categories, using the potency of the ambiguous object' ([Bud, 1995: 13](#)). There has hardly been a scholar in the history of science and technology with a longer and richer record in experimenting with innovative approaches to narrate temporal and cultural changes in science and technology through the lens of artefacts. Among a multitude of impressive scholarly achievements, Robert has pioneered the development of complex websites as tools for the public dissemination of artefacts-based knowledge to reach audiences even bigger than the millions of people who annually visit 'his' institution, the Science Museum. And his formative role in enabling transnational research collaborations and scholarly networks is as highly recognised by the overlapping communities of museum curators and historians of science and technology as is his scholarly creativity and intellectual versatility. There is no reason to doubt that Robert Bud, curator emeritus of one of the most eminent research museums in the world and as such freed from the burdens of administrative duties, will continue to actively engage in novel and fruitful scholarship – *ad multos annos*.

Component DOI: <http://dx.doi.org/10.15180/201310/005>

Tags

- [History of science](#)
- [History of technology](#)
- [Museology](#)
- [Museum collections](#)
- [Curating](#)
- [Science communication](#)
- [Science museums](#)

- [History of chemistry](#)
- [Research in museums](#)
- [Collaborative research](#)
- [Object interpretation](#)

Footnotes

1. The material turn, or materiality turn, can be understood as a reaction to the discursive turn. It focuses on the role of material objects in human actions and advocates for a blurring of the boundaries between human actors and non-human actants. One of the most prominent representatives of the material turn has been Bruno Latour and his Actor Network Theory (ANT).
2. Boyle and Hagmann, 2017 <https://opensi.si.edu/index.php/smithsonian/catalog/book/168> (accessed online on 19 March 2019); from 2009–2016, Martin Collins also served as editor of the journal *History and Technology* (Routledge).
3. European Parliament, Lisbon European Council, 23 and 24 March 2000: Presidency Conclusions https://www.europarl.europa.eu/summits/lis1_en.htm (accessed 19 March 2019); see also Kohlrausch and Trischler, 2014: 277–280; Wirsching, 2015
4. See the *Making Europe* website <https://www.makeurope.eu/books> (accessed 16 April 2020).
5. <http://www.inventingeurope.eu/> (accessed online on 19 March 2019)
6. <http://www.honest2020.eu/> (accessed 19 March 2019)
7. Butler, S and Bud, R, 2016, United Kingdom. Short Country Report http://www.honest2020.eu/sites/default/files/deliverables_24/UK.pdf (accessed 19 March 2019)

References

1. Arapostathis, S, Bud, R and Trischler, H, 2020, 'Nuclear Energy in Europe: A Public Technology', in Kaijser, A et al (eds), *Engaging the Atom. The History of Nuclear Energy and Society in Europe from the 1950s to the Present* (Morgantown: West Virginia University Press), in press
2. Boyle, A and Hagmann, J-G (eds), 2017, *Challenging Collections: Approaches to the Heritage of Recent Science and Technology* (Washington, DC: Smithsonian Institution Scholarly Press)
3. Bud, R, 1993, 'The Museum, Meaning, and History: The Case of Chemistry', in Mauskopf, S (ed), *Chemical Sciences in the Modern World* (Philadelphia: Pennsylvania University Press), pp 277–94
4. Bud, R, 1995, 'Science, meaning and myth in the museum', *Public Understanding of Science* 4 (1): 1–16
5. Bud, R, 2010, 'Power, Belief and Trust – A Context for Scholarly Priorities in the History of Science', in Lehmann-Brauns, S, Sichau, C and Trischler, H (eds), *The Exhibition as Product and Generator of Scholarship* (Berlin: Max-Planck-Institut für Wissenschaftsgeschichte, 2010), pp 29–32
6. Bud, R, Finn, B and Trischler, H (eds), 1999, *Manifesting Medicine. Bodies and Machines* (Amsterdam: Harwood)
7. Collins, M, 2005, 'Introduction', in Collins, M and Millard D (eds), *Showcasing Space* (London: Science Museum), pp 1–6
8. Daston, L, 2004, *Things That Talk: Object Lessons from Art and Science* (New York: Zone Books)
9. Edgerton, D, 2006, *The shock of the old. Technology and global history since 1900* (London: Profile Books)
10. Fox, R, 1990, 'Research and curatorship in the national science museums: a reflexion on threats and opportunities', *Impact of science on society* xi: 263–71
11. Fox, R, 1998, 'Der Vergangenheit eine Zukunft: Wissenschaft und ihre Wahrnehmung in der Öffentlichkeit', *Kultur & Technik* 22 (3): 42–5
12. Fox, R, 2007, 'Museums of science and technology in Europe since 1980', in Anderson, R G W et al (eds), *Chymica acta. An autobiographical memoir by Frank Greenaway, with essays presented to him by his friends* (London: Jeremy Mills, 2007), 215–28
13. Hagmann, J-G, 2014, 'Exhibition Review: *Collider: Step Inside the World's Greatest Experiment*', *Technology and Culture* 55, pp 716–722
14. Jørgensen, F-A and Jørgensen, D, 2016, 'The Anthropocene as a History of Technology: *Welcome to the Anthropocene: The Earth in Our Hands*, Deutsches Museum, Munich', *Technology and Culture* 57, pp 231–237
15. Kohlrausch, M and Trischler, H, 2014, *Building Europe on Expertise. Innovators, Organizers, Networkers* (London: Palgrave Macmillan)
16. Misa, T and Schot, J, 2005, 'Inventing Europe: Technology and the Hidden Integration of Europe', *History and Technology* 21: pp 1–21
17. Oldenziel, R and Hård, M, 2013, *Consumers, Tinkerers, Rebels. The People who Shaped Europe* (London: Palgrave Macmillan)
18. Trischler, H and Bud, R, 2018, 'Public Technology: Nuclear Energy in Europe', in *History and Technology* 34: pp 187–212

<https://doi.org/10.1080/07341512.2018.1570674>

19. Wirsching, A, 2015, 'Toward a New Europe? Knowledge as a Transformational Resource since the 1970s', *Bulletin of the German Historical Institute in Washington D.C.* 56 (Spring 2015): 7–22

Author information



Helmuth Trischler

Head of Research, Deutsches Museum

[Contact this author >](#)

Helmuth Trischler is Head of Research, Deutsches Museum, Munich, Professor of Modern History and the History of Technology, Ludwig-Maximilians-Universität, Munich and Director, Rachel Carson Center