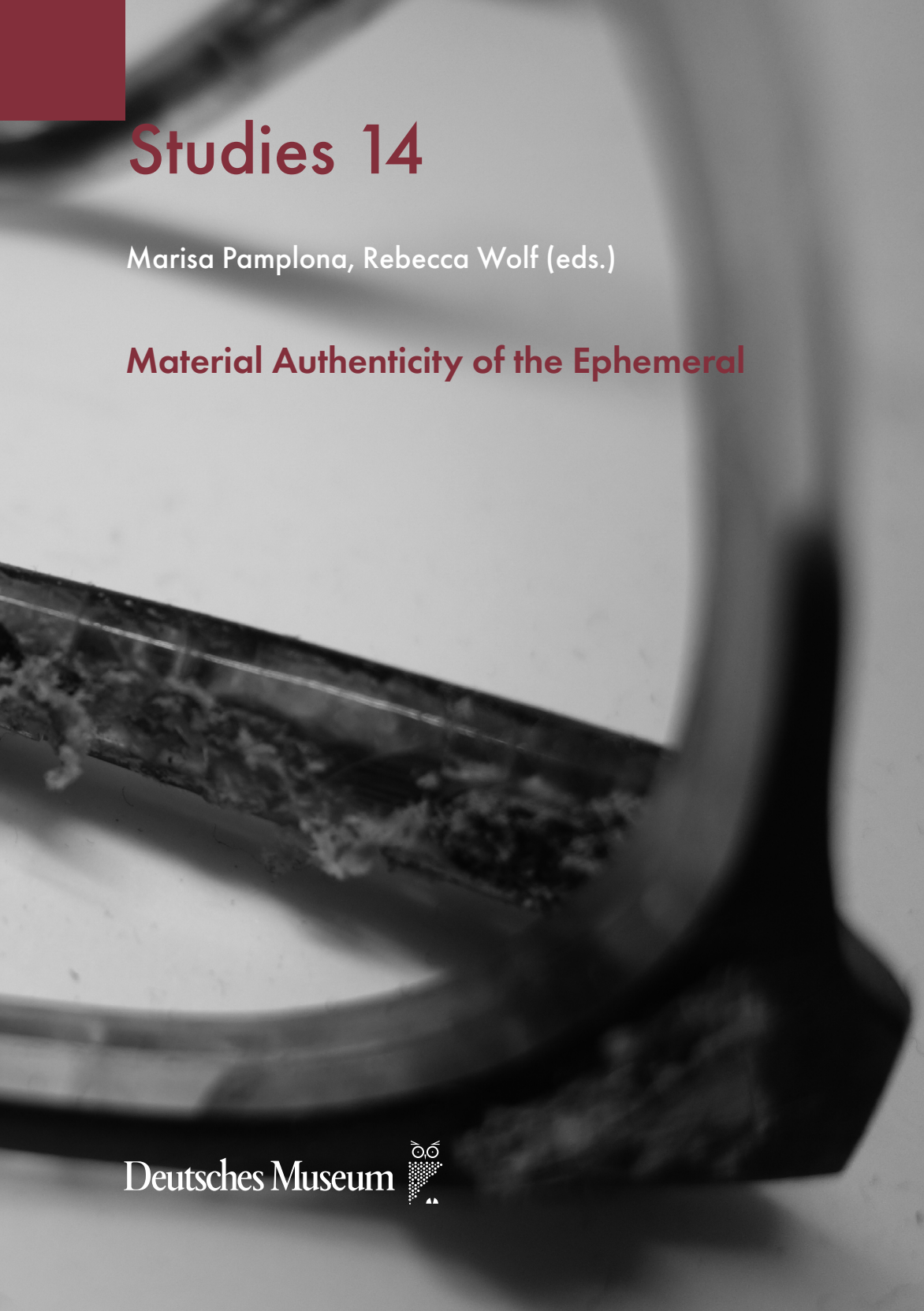


Studies 14

Marisa Pamplona, Rebecca Wolf (eds.)

Material Authenticity of the Ephemeral

Deutsches Museum

Material Authenticity of the Ephemeral

Deutsches Museum Studies
Edited by Eva Bunge, Frank Dittmann, Ulf Hashagen, Marisa Pamplona,
Matthias Röschner

Volume 14

Marisa Pamplona holds a Ph. D. in Engineering Science and is Head of the Conservation Science Department and Research Laboratory that she established at the Deutsches Museum in Munich in 2014.
Rebecca Wolf is director of the Staatliche Institut für Musikforschung in Berlin. She is a musicologist with a focus on the cultural history of music and organology in the nineteenth and twentieth century, on the history of interpretation and media studies.

Marisa Pamplona, Rebecca Wolf (eds.)

Material Authenticity of the Ephemeral

Deutsches Museum

Bibliographical information published by the Deutsche Nationalbibliothek
The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliographie; detailed bibliographic information are available on the Internet at http://dnb.dnb.de.

Marisa Pamplona, Rebecca Wolf (eds.): "Material Authenticity of the Ephemeral"
Deutsches Museum Verlag, 2025

Editing: Markus Ehberger, Paul Kilbey
Layout and Design: Jutta Esser
Cover Illustration: Deutsches Museum
Printing and Binding: Steininger Druck, Eichenried
ISSN 2365-9149
ISBN 978-3-948808-19-8
URN nbn:de:bvb:210-dm-studies14-2

Contents

Appendix

Introduction

Material Authenticity of the Ephemeral

Marisa Pamplona and Rebecca Wolf

Institutions of cultural heritage and the objects they collect, study, conserve, curate, and exhibit enjoy a special kind of status. What the visitors encounter in museum exhibitions is considered 'authentic'. It is perceived, if not explicitly stated otherwise, as 'the real thing'.[1] This concerns not only the information that is provided about the objects, the description of their use, and their historical meaning, but also their physical form. And this ascription takes place even though the visitor is certainly aware of the ephemeral nature of the exhibited objects. In fact, at least for historical objects, signs of decay, such as rust, might even increase the sense of authenticity connected to an object.[2] But also for other institutions, such as museums of contemporary art, and for objects of ephemeral artforms, such as music, performances or time-based media, visitors assume the exhibits to be authentically displayed.

As such, ephemerality, whether in its performative or in its material dimension, is not a hindrance for the perception of an authentic display. Rather, the above should point towards the nearly unavoidable interrelation between the authentic, the material, and the ephemeral in the context of cultural heritage. Museums of natural history, science and technology, or musical instruments, and even museums concentrating on historical cultures all have to deal with ephemeral material, their conservation, their exhibition and the associated challenges. As is the premise of this volume, bringing together the theories and methods from conservation science, material culture studies, and museums studies, as well as their perspectives on the material, the authentic and the ephemeral, offers new potential for future practice and theory in these fields. A similarly premised multi-perspective approach may be found in the proceedings of conferences 'Museums – Places of Authenticity?'[3] and 'Authenticity in Transition: Changing Practices in Contemporary Art Making and Conservation'[4], recently dedicated to these topics.

Ephemerality is encountered by restorers, conservators and curators in several ways, which require special handling. Whether natural or synthetic materials or their decomposition products, these all depict layers of passing time and require well documented and transparent decision-making processes on ways of dealing with their fugacity.

1 In a visitor study (Hampp and Schwan, 'Perception') the museum context was the most important characteristic of the object that led to its identification as authentic by visitors.

2 Although Sandra Kaiser ('Vom "Ansehen der Alterthümlichkeit"') discusses the role of rust in the ascription of authenticity of objects in the research on archaeological objects during the nineteenth century, the slight generalisation above seems reasonable.

3 Kimmel and Brüggerhoff, *Museen*.

4 Hermens and Robertson, *Authenticity*.

The preservation of an object's materiality is not always compatible with the preservation of its function, and we are necessarily faced with the question: Which part of an object do we consider to be authentic and, thus, aim to preserve? Such a question raises further questions about the meaning and value of materials and form, use and function, historical and conceptual contexts, many of which will be discussed explicitly in the contributions of this volume.

Conservators and curators handling historical museum objects have found new ways to deal with particularly sensitive materials. Non-destructive testing methods allow for a detailed examination of objects, sometimes also from hidden interiors in a black box. When modern scanners, computed tomography or digital conversions are used, new media becomes available: as high-resolution images, three-dimensional representations, or audio and video records. These media sustain a thorough documentation, reconstruction and medial presentation of objects. Furthermore, the investigation process generates new perspectives of (re-)presentation. Especially the presentation of highly sensitive objects can be replaced through media, disintegrating objects can be made available digitally, selected aspects can be more easily documented, and media can support the contextualisation of objects in exhibitions.

But also, contemporary art poses great challenges to cultural institutions devoted to their understanding, exhibition and preservation, particularly regarding how to deal with the artist's intentions and ephemeral materials. As described by David Scott, there are:

> artists who are dismayed by inherent vice [of their works] and those who are not; artists who do not wish their decaying works to be restored and artists who do; artists who never intended for inherent vice to destroy their art and whose [sic] who do not care; artists who have thought about the problems of decay and who have deliberately sought out high-grade art conservation materials; artists who would like to, but cannot afford, the materials suitable for longevity; or who never realized that the supposedly stable modern materials they were using were, in fact, unstable; artists who deprecate the conservators [sic] attempt at documentation of their original work and those who wish a record to be preserved.[5]

Questions of authenticity and preservation can support or compete with each other. For example, the Nara Document on Authenticity enabled different concepts of authenticity in conservation practice to be considered, in order to 'clarify and illuminate the collective memory of humanity'.[6] It enlarged the 'scientific rationalism of earlier pronouncements in Conservation Charters which laid such an important stress on the material authenticity of the artefact'.[7] The Nara Document states: 'Depending on the nature of the cultural heritage, its cultural context, and its evolution through time, authenticity judgements

5 Scott, 'Conservation', 300.
6 ICOMOS, *The Nara Document*.
7 Scott, 'Conservation', 294.

may be linked to the worth of a great variety of sources of information' as 'form and design, materials and substance, use and function, traditions and techniques, location and setting, and spirit and feeling'.[8] Authenticity is therefore fragmented, contested and performative,[9] being a concept 'fought over by many powers, power structures, ideological constructions, and the politics of signification'.[10]

Just to exemplify what is considered to be materially authentic and what is thus conserved, imagine that the same model of an industrial object existed in two different museums, each one located in different parts of the globe, with their specific history and past culture. Most likely, those objects would be exhibited and preserved in different ways. Therefore, the stakeholders and the documentation of the decision-making process, involving not only 'what' is considered authentic but also the rationale behind all points of view, are relevant for present and future generations. The participatory concept of cultural significance enjoys growing awareness and relevance.

We, thus, consider it necessary to professionalise the process of reflection and validation of such questions, in our case by engaging a group of people from several disciplines in discussions that help interpreting the multi-layers of evidence from the past and reflect upon their contextualisation in our present society. The result of such discussions cannot constitute a single valid solution; rather something new is created based on several perspectives. An international symposium held at the Deutsches Museum on 16–18 October 2017, dedicated to discussing current methods, theories and trends in conservation science, material culture studies and museums studies, focused on the diverse aspects of ephemerality, materiality and authenticity. The three research areas are closely connected and face fascinating challenges when dealing with ephemeral materials, their preservation and conservation.

The following compilation of papers has a wide range of different topics: urban and industrial heritage, software-based art installation, musical performance, digital documentation and historical reflection on authentication processes conducted by museums. Multiple perspectives, methods, interpretations and wishes for more interaction and shared knowledge were a common element. For sure, each cultural heritage manifestation is valued, kept and presented with its own singularity. Yet, as we learned, time influences our perception of the objects because, over the years, they are associated with different cultural institutions and are always contextualised and handled by certain groups of stakeholders. The potential of cultural heritage relies exactly on the multi-perspectives it may open for further interpretation, effect and use.

The last point is strikingly argued for by **Stefan Simon,** who in his contribution explores the role of heritage sciences for the identification, conservation and management of cultural heritage. Cultural heritage is subject to change not only in its material dimension. Simon (as will Achim Saupe in the concluding chapter) highlights the role of

8 ICOMOS, *The Nara Document.*
9 See Funk, Huber, and Groß, 'Exploring the Empty Plinth'.
10 Lewinsky, 'The Evolution of Authenticity', 13.

values for cultural heritage. It is the subject of negotiations between different groups of stakeholders, with different sets of historically and culturally dependent values. Since values change over time, conservation, as an aim at preserving integrity and access, should thus be considered as 'sustainable management of change'. As Simon argues, heritage science contributes to this process by exploring the context and content of cultural heritage, thereby enriching its value while embracing the diversity of world perspectives.

While Simon partially locates the ephemerality of cultural heritage in the changing set of values and in reference to the involved stakeholders, **Stefan Brüggerhoff's** contribution is concerned with the material ephemerality of the seemingly robust and persistent objects of industrial heritage. Drawing from Brüggerhoff's discussion on the conservation and management of decommissioned industrial plants and their facilities, we can identify how their (material) authenticity is challenged in a threefold manner. First of all, as the materials themselves decay, they have to be preserved and possibly replaced. Secondly, industrial plants stretch over huge areas, and capabilities of preserving them as an ensemble are naturally limited. Thirdly, even the movable inventory of industrial heritage requires huge spaces and, hence, the collection of an authentic ensemble reflecting historical development needs extraordinary resources. Restoration with new materials, the preservation of exemplary areas, reuse of the buildings or even controlled decay, are among the practiced solutions, which comprise the explicit and exact documentation, and the involvement of the public and the former operators of the facilities. A strategy to minimise the risk of the 'loss of authenticity' by enlarging the collection of movable industrial objects is achieved, as described by the author, by 'shared collecting' among different institutes within a network.

The preservation of time-based media, often considered ephemeral in nature and discussed by the Tate conservator **Patricia Falcão** in an adapted interview with **Julia Sawitzki**, constitutes a counterpoint to the conservation of the seemingly long-lived industrial plants. As described by Falcão, the team-based efforts, starting in the pre-acquisition phase and aiming at long-term preservation, face the loss of authenticity at diverse stages. Alterations due to the copying of files during acquisition, specific compression, software complementarity, but also changes in the environment on which the media is projected might corrupt the integrity of the artworks. The strategies to ensure authenticity comprise close contact with the artists themselves and their authorisation of the copied files, but also include the acquisition of hard- and software to ensure their correct execution. As becomes clear through the interview, technical experts, stakeholders, and also materials and hardware all play their part in the preservation of these ephemeral artforms.

While Patricia Falcão's working material is often already digital, **Nadja Wallaszkovits** reflects on the practices and conceptual challenges of the restoration, digitisation and long-term preservation of sound recordings stored on analogue media. Standard procedures of mass digitisation can function as an effective tool. Yet the material dimension of the analogue medium, the peculiarities of the original recording devices, and the deliberate step to exceed its capabilities pose challenges that can only be overcome by

close attention to the original working and recording process of the artist. Wallaszkovits' workshop report on the restoration and digitisation of Oskar Sala's audio tapes brings this fact into sharp relief. Sala manipulated, cut, or twisted the tapes to create specific sounds and atmospheres. He used stamps, pieces of papers and handwritten notes on the tapes as markers. As the conservator noticed: 'Sala used the tapes practically as a notebook.' In the given case, the authenticity of the digital reproduction was ensured through a multi-media approach, optically recording the tapes while played. The material dimension of the tapes was transferred to a visual one. The motto was: 'Audio goes video'.

A particular challenge in the preservation process, which Wallaszkovits describes, was the identification of the speed at which Sala's tapes should be played; using a wrong tempo certainly would have corrupted the authenticity of the digital reproduction. Such possible manipulations during replay of an original performance is exactly the point at which **Rebecca Wolf's** discussion on the use of player pianos at the turn of the twentieth century sets in. Through hand-levers and pedals, the speed and the dynamics of recorded interpretations could be closely followed or altered when using the player piano. Referring to contemporary assessments, Wolf argues that playing such devices was actually 'a performative act'. It offers the opportunity to create its own interpretation on the run, when using the devices individually, after studying the notation. The authenticity of the recorded interpretation was authoritatively ensured by the artists signing the corresponding rolls. Yet, through her study of the actual practice of the pianola playing and its contemporary assessment, Wolf opens the room for the possible ascriptions of the authentic in connection to the ephemeral musical piece: Is it the artist's performance and the interpretation? Or is it the interpretation of the pianola player emerging in the human-machine interaction?

Questions of authenticity may thus arise in connection with an actual performance, as in the case of the pianola, being the materials of the historical instruments and rolls considered authentic. In the case of Nam June Paik's destructive performance *One for Violin Solo* (1962), as **Katja Müller-Helle** argues, a more complex judgement on its material nature was necessary. The performance consists of a phase of a slow and concentrated lifting of a violin and its subsequent, explosive smashing. As such, it leaves material remains: the fragments of a destroyed classical instrument, which are conserved, curated and exhibited in museums. But, as Müller-Helle's premise goes, *One for Violin Solo* was from its beginning constituted not only in the ephemeral performance or the material remains, but by the media of photography and film, which 'entails a pictorial encoding of the concept of material'. Müller-Helle argues for this premise on grounds of the conceptualisation of the original performance and its diverse re-performances. She thereby creates a new interpretation of *One for Violin Solo*. Its performances and the dispersal of their medial display are part of the artwork. Thus, Müller-Helle's assessment of the material dimension of the artwork directly alters what we might consider authentic in connection to this destructive piece. The authentic artwork is, in this understanding, not the original and ephemeral performance but rather constituted of an open-ended and multi-narrated process.

Like Stefan Simon in the first contribution to this volume, in the concluding chapter

Achim Saupe closely connects issues of authenticity to values of communities. Saupe specifically engages with the values of the past, not only in the sense of the values of past communities but more importantly in the sense of the values 'that colour our interpretation of the past' and of the value of the past for the modern self-understanding of societies. According to Saupe, 'the question of the extent to which the material authenticity of the ephemeral can be retained is also a question of values.' Saupe, thus, understands authenticity neither as an essential feature of an object nor from a purely constructivist perspective, but as an attribution that emerges when 'doing history', when communities or individuals engage with their past; it is a process. Such an understanding, as Saupe argues, allows for a deeper study of the notion of authenticity by deconstructing the claims of authenticity in current and past societies.

The perspectives on the material authenticity of the ephemeral collected in this volume are certainly diverse. They exemplify different approaches to ensuring and constructing authenticity, for example through the use of additional visual media in the digitisation of audio signals, or through authorisation from artists. The material dimension of the considered objects stretches from the monumental buildings of industrial heritage to time-based media and installations. Although all of these objects are certainly ephemeral, the temporal scope stretches from a rather robust existence in time and space to the fleeting moment of a performance. Nevertheless, we can sense a guiding theme in these contributions: the attention to our own practices and interventions in the creation or maintenance of the authenticity of (historically situated) objects.

As should become clear throughout this volume, a universal and timeless understanding of (material) authenticity can no longer be held; what 'preserving the ephemeral' means is culturally and historically dependent. But the reasons for ascribing something the value of authenticity, and the actions taken in its preservation, are neither whimsical nor careless. Making our practices and the reasons for adopting them explicit, as the contributions to this volume do, is one of the most important tasks, as Saupe also observes, for creating credibility and trust. All the same, communication among different fields of research and practice, the involvement of different stakeholders and the public, and the inclusion of (often suppressed) cultural groups and their perspectives enrich our understanding of a particular object, increase its cultural value and open different paths and possibilities for the definition of its authenticity. These authenticities should be explored and are essential for preservation. As the *Authenticity in relation to the World Heritage Convention* has stated: 'The essential contribution made by the consideration of authenticity in conservation practice is to clarify and illuminate the collective memory of humanity.'[11]

The editors wishes to thank the Leibniz Research Alliance 'Historical Authenticity' and the Deutsches Museum for funding the conference and the work on the publication. Many thanks to Markus Ehberger for his important support and editorial assistance, and to Marco Valente Chavez Lozano for a final careful reading

11 UNESCO, *Guidelines.*

Bibliography

Funk, Wolfgang, Irmtraud Huber, and Florian Gross. 'Exploring the Empty Plinth: The Aesthetics of Authenticity.' In *The Aesthetics of Authenticity*, ed. by Wolfgang Funk, Florian Gross and Irmtraud Huber, 9–21. Bielefeld: transcript, 2012. https://www.academia.edu/4543018/Exploring_the_Empty_Plinth_The_Aesthetics_of_Authenticity (accessed 26 July 2022).

Hampp, Constanze, and Stephan Schwan. 'Perception and evaluation of authentic objects: findings from a visitor study.' *Museum Management and Curatorship* 29, no. 4 (2014), 349–367. doi: 10.1080/09647775.2014.938416.

Hermens, Erma, and Frances Robertson, eds. *Authenticity in Transition: Changing Practices in Contemporary Art Making and Conservation*. London: Archetype Publications, 2016.

ICOMOS. *The Nara Document on Authenticity*. 1994. https://www.icomos.org/fr/179-articles-en-francais/ressources/charters-and-standards/386-the-nara-document-on-authenticity-1994 (accessed 25 July 2022).

Kaiser, Sandra. 'Vom "Ansehen der Alterthümlichkeit" – über den "Rost" achäologischer Metallobjekte im 19. Jahrhundert.' In *Museen – Orte des Authentischen? Museums – Places of Authenticity?* ed. by Dominik Kimmel and Stefan Brüggerhoff, 57–64. Heidelberg: Propylaeum, 2020 (= RGZM – Tagungen, Volume 42).

Kimmel, Dominik, and Stefan Brüggerhoff, eds. *Museen – Orte des Authentischen? Museums – Places of Authenticity?* Heidelberg: Propylaeum, 2020 (= RGZM – Tagungen, Volume 42). doi: 10.11588/propylaeum.745.

Lewinsky, Jessica. 'The Evolution of Authenticity and the Integration of Philosophical Tools for its Determination.' *Studies in Conservation* 67 (2022), 1–2, 5–15. doi: 10.1080/00393630.2021.2014036.

Scott, David A. 'Conservation and authenticity: Interactions and enquiries.' *Studies in Conservation* 60, no. 5 (2015), 291–305. doi: 10.1179/2047058414Y.0000000159.

UNESCO. *Operational Guidelines for the Implementation of the World Heritage Convention*. 2021. https://whc.unesco.org/document/190976 (accessed 25 July 2022).

Conservation Science and Cultural Heritage

Exploring Context and Values: The Role of Heritage Science in Cultural Heritage Research

Stefan Simon

> "Beauty is no quality in things themselves: It exists merely in the mind which contemplates them."[1] David Hume (1711–1776)

Abstract

Cultural heritage is ephemeral, and although it can be quite resilient, it cannot be regarded as a renewable commodity. The task of sustaining cultural heritage in the face of constant change often becomes subject to considerable tensions. There is no single, monolithic way of understanding cultural heritage, so approaches to its preservation must necessarily reflect this diversity of perspectives – perspectives that change continuously as a function of time and space.

If conservation can be described as management of change, good conservation can be defined as 'sustainable management of change', starting with the interdisciplinary exploration of the direct and indirect context of cultural heritage, defining its values and aiming at optimising preservation, integrity and access to cultural heritage.

Heritage science, at the crossroads of art, natural and social sciences, engineering, business and law, has a crucial role to play in this process. It contributes significantly to exploring the context of cultural heritage, often increasing its value through research and education. It contributes to the solving of questions around access and authenticity, important core challenges for turning modern museums green, and, most importantly, is increasingly embracing the diversity of world perspectives.

Cultural heritage is the essential record of human existence and identity. It is the thread of continuity for which people search when the rhythm of everyday life has been shattered. A current UNESCO definition describes cultural heritage as 'our legacy from the past, what we live with today, and what we pass on to future generations'.[2]

Article 22 of the 'Charter of Fundamental Rights of the EU on cultural, religious and linguistic diversity' states: 'The Union shall respect cultural, religious and linguistic diversity.'[3] Diversity is key for European identity, a concept of continuous metamorphosis and transition.[4]

1 Hume, *Essays*.
2 UNESCO World Heritage Centre, *World Heritage*.
3 European Union, 'Charter', Article 22.
4 Simon, 'The Importance of Identity'.

This cultural heritage is 'a very fragile patrimony and is exposed to multiple risks due to ageing, adverse environmental conditions and human pressure'.[5]

The 2005 'Council of Europe Framework Convention on the Value of Cultural Heritage for Society' (Faro Convention), defines 'cultural heritage' as

> a group of resources inherited from the past which people identify, independently of ownership, as a reflection and expression of their constantly evolving values, beliefs, knowledge and traditions. It includes all aspects of the environment resulting from the interaction between people and places through time.[6]

The convention also defines the concept of a 'heritage community' comprising 'people who value specific aspects of cultural heritage which they wish, within the framework of public action, to sustain and transmit to future generations'. This illustrates the reciprocal relationship between any form of cultural heritage and its respective heritage community.

A strong allegiance to heritage connects people across all cultural and political boundaries. No matter where we come from, no matter what we studied, we have an astonishing ability to understand the significance of cultural and natural heritage. Any loss of cultural heritage is indeed a loss of our common memory, impairing our ability to learn, to build experience, and to apply the lessons of the past to the present and the future. In an encyclical letter, Pope Francis (*1936) writes in 2015: 'The disappearance of a culture can be just as serious, or even more serious, than the disappearance of a species of plant or animal'.[7]

With the world changing at a rapid pace, research as well as academic training must keep up with these challenges. What is cultural heritage about? And how can we preserve our collections, monuments and sites in a sustainable way for future generations? What is the role of the comparatively young discipline of heritage science in this process?

Cultural heritage is by no means only a positive resource. It is often contested: a good and recent example is the fate of the many Confederate monuments in the US, a debate ignited 2015 in the aftermath of the terrorist attack by white supremacist Dylann Roof, who killed nine people at a Bible study in the Emanuel African Methodist Episcopal Church in Charleston, South Carolina.

While some Confederate monuments have been disguised (Fig. 1) or removed (Fig. 2), the 'antimonumento' movement of Mexico for example has erected a memorial for the forty-three students of the 'Iguala case', who disappeared some years ago, on a prominent avenue in Mexico City. Generally, we notice a shift from the curatorial approach, to a more ecologic approach to preservation. Traditional authorities are releasing control over heritage and its narrative, in and outside of museums and memory institutions.

5 European Union, 'Commission', Paragraph 1.
6 Council of Europe, *Council of Europe*, Article 2.
7 Francis, *Laudato si'*.

Fig. 1 Confederate Soldiers and Sailors Monument, Birmingham, AL, 2018, dismantled and removed in 2020.

Fig. 2 Pedestal of the Stonewall Jackson and Robert E. Lee Monument, Baltimore, MD, 2018.

Several memorial markers near the Tallahatchie River, MS, devoted to the brutal killing of Emmett Till (1941–1955), which in part sparked the civil rights movement in the US, have been repeatedly vandalised and punctured by bullets over the past few years (Fig. 3). They were replaced by bullet-proof steel markers in October 2019.

Another example of difficult cultural heritage is the Minidoka National Historic Site in Idaho. The Minidoka Relocation Center (1942–45) was one of ten camps at which 110,000 Americans of Japanese descent were interned during World War II, contrary to their constitutional rights, in the western United States (Fig. 4).

The late David Lowenthal explains why cultural heritage is often contested, and what he perceives as the difference between 'History' and 'Heritage': 'History explores and explains pasts grown ever more opaque over time; heritage clarifies pasts so as to infuse them with present purposes'.[8] Or in other words, by Jan Assmann: 'The past is not a natural outcrop, it is a cultural creation'.[9]

Among the indigenous peoples of North America – the First Nations or the Native Americans – there are values regarding cultural heritage which are diametrically opposed to the traditionally western perspectives. While the western view of the object focuses on its materiality, what is important for the indigenous peoples is rather what the object represents.[10]

While museums in the western community are certainly high-trust institutions, the mistrust among the First Nations towards them is obvious. In western conservation ethics, reduction of use to avoid wear and tear is a basic principle of conservation. For native communities, however, use often means preserving culture. Beyond questions of ownership, tensions arise around the proper conservation strategy, which are at best tackled in a continuous, long-term dialogue between all parties. What 'sharing heritage' really means is bringing this debate together, dealing with opposing, even mutually exclusive views, and seeking compromise.

The role of heritage science

The idea to include every known and available science in the study of cultural heritage can be traced back to the nineteenth century, to Rudolf Virchow (1821–1902), founder of the Anthropological Society in Berlin, in 1869. Soon after, the foundation of the Chemical Laboratory at the Berlin Royal Museums and the appointment of Friedrich Rathgen (1862–1942) as its first director on April 1, 1888 marks the birth of heritage science as a scientific discipline. Article 2 of the groundbreaking Venice Charter (1964) indicates that 'the conservation and restoration of monuments must have recourse to all the sciences and techniques which can contribute to the study and safeguarding of the architectural heritage'.[11]

8 Lowenthal, *The Heritage Crusade*, XV.
9 Assmann, *Das kulturelle Gedächtnis*, 48.
10 Clavir, *Preserving what is valued.*
11 ICOMOS, *Charter.*

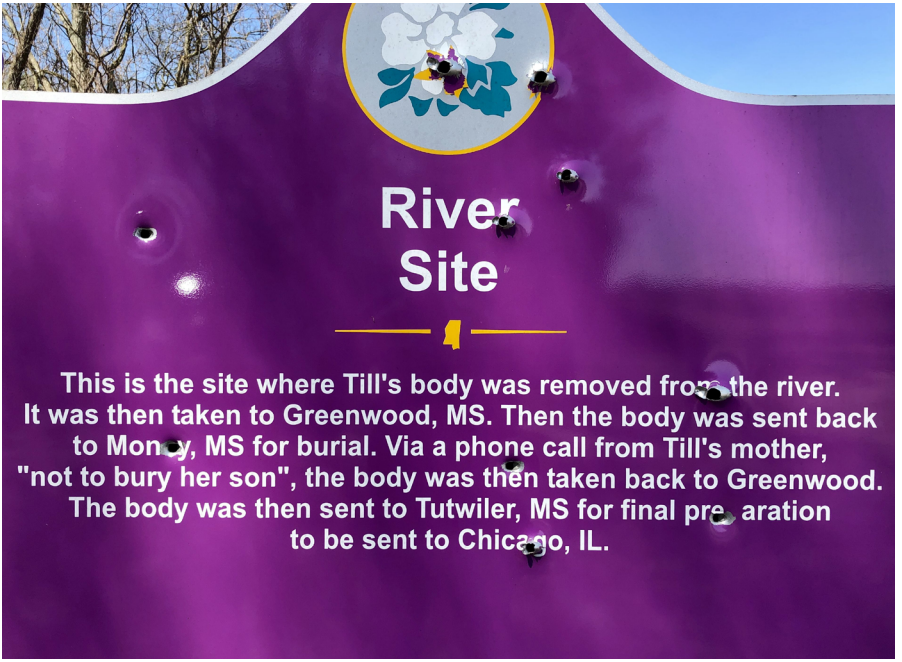


Fig. 3 Bullet-punctured memorial marker at the River Site, Glendora, MS, 2019.

Fig. 4 Minidoka National Historic Site, ID.

With the 'Nara Document on Authenticity' (1994)[12] the idea ends that there are absolute criteria for the assessment of values and authenticity, as cultural dependencies control the perception of cultural heritage. The 'Burra Charter' by ICOMOS Australia defines conservation as 'all the processes of looking after a place so as to retain its *cultural significance*'.[13] Both documents have opened the doors to a value-driven concept of conservation, where cultural significance is defined by a variety of value categories of e.g. a historic, aesthetic, social, scientific or financial nature, expanding the concept of conservation beyond purely material-based criteria.

With the increasing importance of a participatory concept, 'stakeholder involvement' became a key element in conservation, somewhat diminishing the influence of the traditional experts, but increasing the sustainability of its efforts. Nevertheless, great disparities continue to exist between more and less connected countries in access, also via the internet.

The free flow of information, within the scientific community, to and back from wider society in terms of open science, presents an important precondition for tackling these challenges. Yet there are severe obstructions to what could be described as the creation of a knowledge society. A lack of transparency, the inaccessibility of data, a failure to connect and the incompatibility of funding schemes are just a few of them. We need to address these concerns, study possible causes and propose suitable tools in order to overcome these obstacles.

Our cultural and natural heritage is increasingly threatened with destruction, not only by physical and chemical causes of decay, but also, more importantly, by changing social and economic conditions. Natural and man-made disasters represent an important factor as well, illustrated in recent years by the cultural war crimes committed in the Middle East and Africa. Many recent conflicts are more 'cultural' and no longer about power politics and economic dominance, but rather about identity, aimed at the destruction of the 'other'.

The accelerating global transformation from a rural into an urban society has massive implications for cultural heritage. More than half of the world's population already lives in urban areas; every week, the global urban population grows by 1.3 million.[14]

Today the fifty largest cities combined would rank at position three, right after China and the US, in the emission table for detrimental greenhouse gases. The loss of agricultural land in countries like Egypt and Nigeria is nothing less than dramatic. In the past five decades, humanity has used up more raw materials, and produced more garbage than in its entire history before.[15]

12 ICOMOS, *The NARA Document.*
13 Australia ICOMOS, *Burra Charter,* 2.
14 Seto et al., 'Human Settlements'.
15 Carroon and Carlson, 'Old is the New Green'.

Global climate change brings rising seawater levels, which have been moving an average of 3.4 mm per year since 1993,[16] increasing floods and severe weather events, and changes not only in temperature and precipitation but also in soils and groundwater. Climate change poses an imminent threat to many sites and collections.

In addition, massive indirect consequences for cultural heritage are expected, through the development and change of tourism flows, and social change in a broader sense, in particular conflict and disaster scenarios. The extent of natural disasters cannot be derived exclusively from quantitatively measurable physical forces, but is rather primarily a social construct according to the 'Pressure and Release Model' (PAR) developed by Terry Cannon.[17] This observation is of great importance for the development of effective preventive measures.

The international tourism sector is a source of both prosperity and decay; while it may advance development, many heritage sites are struggling with its negative impact, on many levels. It is one of the largest and fastest growing economic sectors in the world, accounting for almost 10% of global gross national product and employment. In a 2016 report on world heritage and tourism in climate change, UNESCO and UNEP point out that tourism is responsible for around 5% of global carbon dioxide emissions, and this share is likely to double over the next twenty-five years.[18]

A study submitted by the National Trust for Historic Preservation in 2011 concluded that it could take between ten and eighty years for a new building, with its energy efficiency 30% better than that of an average building, to compensate for the negative impact on climate change caused by the manufacturing process.[19]

While this calls for a strong alliance between environmentalists and preservationists, it is obvious that caring about the environment is a natural extension of the stewardship of collections, which is the primary role of musems.[20]

In many fields of heritage science, we measure external parameters, not their impact on the object or its reaction to it. In museums, for example, we regularly measure relative humidity and temperature, as well as their fluctuations, but only rarely the mechanical reaction of collection objects in response to them, their change in size, possible tensions and crack formation. We measure pollutant concentrations in the environment, but not the kinetics and formation speed of corrosion products.

In conservation, problems are traditionally viewed in a more individualistic way. For instance: 'On day X, the window was opened in the museum and the panel painting cracked due to the immediate onset of drying'. Such an empirical approach is legitimate in principle, but the many other objects that may not have been affected by that humidity

16 NASA, *Understanding Sea Level*.
17 Cannon, 'Disasters, climate change and the significance of culture'.
18 UNEP, UNESCO and Union of Concerned Scientists, *World Heritage*.
19 Preservation Green Lab, *The Greenest Building*.
20 Martin, *Green Goals*, 47.

change are often forgotten. What is needed is a truly epidemiological approach, without which public health services would not be as efficient as they are today.

Good modelling is required, which is being sought in industry via digital twins – virtual images of a real machine or system. In fact, digital twins are increasingly proving that they can provide for optimised processes in a production environment.

New methods both for formal education in heritage and for public engagement are needed as well. When we learn something about cultural heritage, we increase its value (Fig. 5, Fig. 6). Knowledge is a contribution to the sum of the value pie. This knowledge trumps possession and needs to be shared among all respective stakeholders; it must be made accessible as widely as possible. Transparency is key.

With the fourth industrial revolution we are experiencing increasing collaborative efforts in collecting data, setting standards, and advancing digital technology for cultural heritage preservation across the humanities and sciences. This will require new forms of technology, addressing issues of the obsolescence of legacy technologies and the migration of data and data formats.

As with the material-related investigation methods, tools must be developed that better and more reliably assess the contribution of cultural heritage to the pursuit of sustainability goals. These methods must take into account the multi-dimensionality of the benefits.[21]

Due to the digital divide, simply posting online resources on the world wide web is not a sufficient solution. 54.1% of the world's population (estimated at 7.6 billion people) have no access to the internet. This offline population is disproportionately illiterate, female, elderly, less educated, lower income and rural.[22] Although the number of internet users has reached 3.6 billion people, the majority of those with access, nearly 2.6 billion, live in developed countries.

There is another important lesson: we note a shift from the assumption that cultural heritage is static to a more dynamic picture in which its very essence relies on the inevitability of constant change. Where once we tried to prevent change, we now find ourselves managing change, and the challenge is how to do so sustainably.

It is also worth mentioning that there are places of memory, such as the route followed by the march from Selma to Montgomery led by Martin Luther King, where physically there is little to be preserved, but because of the events that took place there, the pathway has transcended into national heritage (Fig. 7).

Conservation is hence a discipline based on critical research into the object and its properties (values) in all imaginable contexts (e.g. archaeological, art historical, and social), which are defined by a heterogeneous group of stakeholders. We need to ask ourselves, who actually is 'us'?

21 Nocca, 'Role of Cultural Heritage'.

22 International Telecommunication Union, *Measuring*.

Fig. 5 μ-XRF investigation on the enamels of the Shrine of the Three Kings, completed by Nicholas of Verdun ca. 1225, Cologne Cathedral, 2007.

Fig. 6 Video holography, acoustically induced diagnosis of plaster detachments, on the bust of Queen Nefertiti, National Museums Berlin 2009, with physicists from Carl von Ossietzky Universität, Oldenburg.

Fig. 7 The Edmund Pettus Bridge, Selma, AL.

Sadly, the conservation profession in our museums is still quite homogeneous, predominantly white, and female.[23] With millions protesting as part of the Black Lives Matter movement around the globe, we are learning how systemic racism has held back under-represented minorities, especially people of colour, in academia and research.[24]

In his opening speech of the nineteenth ICOMOS General Assembly in New Delhi in 2007, Sadhguru Jaggi Vasudev said: 'Anything dead can't be preserved for too long. Heritage means we have to infuse life into it, the entire population has to get involved, if heritage becomes living, the world gets enchanted'.[25]

Our challenges in heritage preservation are 'linked to those of the entire international community, such as climate change, migration, and energy security',[26] and there is both a scientific and a cultural dimension to all of them.

In the roadmap for sustainable conservation of the twenty-first century, conservation can no longer be just about objects or sites. It has to be about the people who are affected by and connected with this heritage, whether they hold some degree of ownership, or wish to explore, use or preserve it.

23 Schonfeld and Westermann, *Demographic Survey*.
24 Nature Methods editorial board, 'Why Black lives matter in science'.
25 Vasudev, *ICOMOS speech*.
26 Moedas, 'Science Diplomacy in the European Union'.

Bibliography

Assmann, Jan. *Das kulturelle Gedächtnis. Schrift, Erinnerung und politische Identität in frühen Hochkulturen.* Second revised edition. Munich: C.H. Beck, 1997.

Australia ICOMOS. *The Burra Charter: the Australia ICOMOS Charter for Places of Cultural Significance.* Revised Version, 2013. http://australia.icomos.org/wp-content/uploads/The-Burra-Charter-2013-Adopted-31.10.2013.pdf (accessed 21 December 2022).

Cannon, Terry. 'Disasters, climate change and the significance of culture'. In *Cultures and Disasters: Understanding Cultural Framings in Disaster Risk Reduction,* ed. by Fred Krüger, Greg Bankoff, Terry Cannon, Benedikt Orlowski and Lisa Schipper, 88–106. London and New York: Routledge, 2015.

Carroon, Jean, and Ben Carlson. 'Old is the New Green'. *Architecture-Boston* 18(3) (Fall 2015): 36–39. https://www.architects.org/stories/old-is-the-new-green (accessed 21 December 2022).

Clavir, Miriam. *Preserving what is valued – Museums, Conservation and First Nations.* Vancouver: UBC Press, 2002.

Council of Europe. *Council of Europe Framework Convention on the Value of Cultural Heritage for Society.* Council of Europe Treaty Series 199 (27 October 2005). https://rm.coe.int/1680083746 (accessed 21 December 2022).

European Union. 'Charter of Fundamental Rights of the European Union'. *Official Journal of the European Communities* C 364/1 (18 December 2000). https://www.europarl.europa.eu/charter/pdf/text_en.pdf (accessed 21 December 2022).

European Union. 'Commission Recommendation of 26 April 2010 on the research joint programming initiative "Cultural Heritage and Global Change: a new challenge for Europe" (2010/238/EU)'. *Official Journal of the European Union* L 106 (28 April 2010): 18–19. http://data.europa.eu/eli/reco/2010/238/oj (accessed 21 December 2022).

Francis. *Encyclical Letter Laudato si'.* 2015. https://www.vatican.va/content/francesco/en/encyclicals/documents/papa-francesco_20150524_enciclica-laudato-si.html (accessed 21 December 2022).

Hume, David. *Essays. Moral, political, and literary.* London: J.B. Bebbington, 1862 [1742].

ICOMOS. *International Charter for the Conservation and Restoration of Monuments and Sites (Venice Charter–1964).* 1964. https://www.icomos.org/en/participer/179-articles-en-francais/ressources/charters-and-standards/157-thevenice-charter (accessed 21 December 2022).

ICOMOS. *The Nara Document on Authenticity.* 1994. https://www.icomos.org/fr/179-articles-en-francais/ressources/charters-and-standards/386-the-nara-document-on-authenticity-1994 (accessed 25 July 2022).

International Telecommunication Union. *Measuring the Information Society Report.* Geneva, Switzerland: ITU, 2016. https://www.itu.int/en/ITU-D/Statistics/Documents/publications/misr2016/MISR2016-w4.pdf (accessed 21 December 2022).

Lowenthal, David. *The Heritage Crusade and the Spoils of History.* Cambridge: Cambridge University Press, 1998.

Martin, David. 'Green Goals'. *Museum Practice* 33 (Spring 2006), 47.

Moedas, Carlos. *'Science Diplomacy in the European Union'.* Science & Diplomacy Vol. 5, no. 1 (March 2016). http://www.sciencediplomacy.org/perspective/2016/science-diplomacy-in-european-union (accessed 21 December 2022).

NASA. *Understanding Sea Level.* 2022. https://sealevel.nasa.gov/understanding-sea-level/key-indicators/global-mean-sea-level (accessed 21 December 2022).

Nature Methods editorial board. 'Why Black lives matter in science'. Nature Methods 17 (2020): 645. https://doi.org/10.1038/s41592-020-0908-7 (accessed 21 December 2022).

Nocca, Francesca. 'The Role of Cultural Heritage in Sustainable Development: Multidimensional Indicators as Decision-Making Tool'. *Sustainability* 9, no. 10 (2017): 1882. http://dx.doi.org/10.3390/su9101882 (accessed 21 December 2022).

Preservation Green Lab, National Trust for Historic Preservation. *The Greenest Building: Quantifying the Environmental Value of Building Reuse*. 2011. http://forum.savingplaces.org/HigherLogic/System/DownloadDocumentFileashx?DocumentFileKey=5119e24d-ae4c-3402-7c8e38a11a4fca12&forceDialog=0 (accessed 21 December 2022).

Schonfeld, Roger, and Mariët Westermann. *The Andrew W. Mellon Foundation Art Museum Staff Demographic Survey*. July 28, 2015. https://www.chicano.ucla.edu/files/news/awmf_museum_diversity_report_aamd_7-28-15.pdf.pdf (accessed 21 December 2022).

Seto, K. C., S. Dhakal, A. Bigio, H. Blanco, G. C. Delgado, D. Dewar, L. Huang, A. Inaba, A. Kansal, S. Lwasa, J. E. McMahon, D. B. Müller, J. Murakami, H. Nagendra, and A. Ramaswam. 'Human Settlements, Infrastructure and Spatial Planning'. In *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, ed. by O. Edenhofer, R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx, 923–1000. Cambridge, UK and New York, NY: Cambridge University Press, 2014.

Simon, Stefan. 'The Importance of Identity'. *Review of European & Transatlantic Affairs* 1, no. 1 (2015), 22–25.

UNESCO World Heritage Centre. *World Heritage*. https://whc.unesco.org/en/about/world-heritage (accessed 20 December 2022).

United Nations Environment Programme (UNEP), Nairobi, Kenya; the United Nations Educational, Scientific and Cultural Organization (UNESCO), Paris, France; and the Union of Concerned Scientists, Cambridge, MA. *World Heritage and Tourism in a Changing Climate*. 2016. https://whc.unesco.org/en/tourism-climate-change/ (accessed 21 December 2022).

Vasudev, Sadhguru Jaggi. *Opening speech, 19th ICOMOS General Assembly New Delhi*. 11 December 2017.

Objects of Industrial Heritage: Significance of Preservation – Feasibility of Preservation. A Special Approach with Regard to the Questions of Authenticity and Ephemerality

Stefan Brüggerhoff

Abstract

The evidence of the industrial past is often considered to be very robust. Questions about an ephemeral character of these testimonies (complex building structures and oversized machinery) are therefore rather irritating for most laymen. However, precisely these objects are endangered. Due to their usually enormous dimensions and high complexity, the feasibility of preservation, and the willingness of organisations to preserve them, are often more important concerns than the significance of preservation. Therefore, the article reflects on some basic ideas for the conservation of technical heritage. Demands for authentic preservation are examined in the context of conservation options. This aims to stimulate the discussion to include such framework conditions into preservation measures at an early stage, and to develop new ways of dealing with these conditions. In addition to immovable objects, mobile technical cultural assets with large dimensions are also dealt with. Discussions of the expansion of museum collections with corresponding objects will be addressed. Affordability in terms of space and protection capacities are a prerequisite for preservation as a collection item. Given these considerations, industrial heritage must certainly be classified as an ephemeral heritage.

Introduction

This short contribution aims to initiate a discussion about the preservation of large technical heritage. It shall help to implement the search for solutions in this field more consistently. In doing so, the focus must not be limited to the significance of preservation and the object value, but must also include the aspect of feasibility of preservation. This is of particular importance regarding large facilities and oversized objects of industrial heritage. Cultural and ethical aspects are one thing, but in many cases the ability (technically and financially) to preserve an object in its numerous facets is of special, if not decisive, relevance for its survival, and thus is a part of the ephemeral character of the industrial testimony.

The preservation of industrial monuments and large technical objects has determined the author's professional life for nearly thirty years, on the one hand in the function of a conservation scientist and on the other hand through his duties in the management of a large technical museum. This has given rise to a very broad view of the necessities of conservation, but also the restrictions that limit their application. For this reason, questions about museum collections are addressed in the same way as conservation strategies for fixed industrial installations. Although the distinction between mobile and stationary objects is used in this chapter, in many cases this distinction has to be

relativised due to the enormous dimensions of some 'mobile' objects of the industrial heritage.

Most examples in the author's career resulted from examinations in the national context, due to the fact that North Rhine-Westphalia and particularly the Ruhr area – where the German Mining Museum is located, in Bochum – is and was one of the largest industrialised regions in Europe. The European Route of Industrial Heritage[1] displays more than 100 industrial heritage sites for North Rhine-Westphalia (out of 1850 across all of Europe) and thus indicates the relevance and significance of the region in the field of technical heritage. It should also be noted that, since the financial situation of monument conservation in Germany often looks better than in other countries, the following generalisation of problems in dealing with industrial monuments is more likely too positively expressed, rather than too negatively.

This article does not intend to provide a theoretical, conservation-substantiating justification for the historical value of large industrial buildings or objects. This has already been clearly defined in numerous other contributions.[2] Rather, it intends to highlight practical questions and problems that exist today in dealing with these objects, and in some cases to provide initial indications of where possible solutions could lie.

Old material and new use

The testimonies of the industrial era of the last 200 years are often characterised by a feature that is of particular importance, without itself having any specific cultural relevance. This characteristic is the often extreme size and complexity of certain objects. While this is absolutely obvious for industrial plants such as textile factories, blast furnaces, coking plants, chemical parks and mines, in certain cases mobile equipment must also be considered in this sense. An overburden conveyor bridge used in lignite mining, such as the F60 in Lichterfeld-Schacksdorf, Brandenburg, is certainly transportable, but nevertheless more likely needs to be seen as a complex monument, and is hardly less expensive to maintain than stationary industrial structures.

The size of these plants automatically results in an enormous cost factor for their maintenance. The sheer amount of space that needs to be protected against corrosion, or even renovated accordingly, is immense, and unfortunately (often deliberately) underestimated at the outset when initial considerations are made about the need for protection.

At the beginning of the assessment it is often merely assumed that ways can be found in the running process to manage the necessary maintenance of the plant. This principle was followed in 1986, when the first outstanding example of German industrial heritage, the Völklinger Hütte, Saarland (Fig. 1), was listed as a national monument (later, in 1994,

1 https://www.erih.de/ (accessed 20 December 2022).

2 As for example in Slotta, *Technische Denkmäler;* Land Nordrhein-Westfalen et al., *Industriekultur;* Wicke, Berger, and Golombek, *Industrial Heritage.*

Fig. 1 The blast furnace plant at the UNESCO World Heritage Site Völklinger Hütte.

it was appointed as a UNESCO World Heritage Site). Ultimately, one must admire the courage of the monument preservation authority in having tackled this immense task without fully reliable figures or strategies for conservation measures based on them. The handling of the dimensions and the industrial substance ultimately had to be 'practised'. Thirty years later, experience is now available which allows for more reliable assessment of necessary measures and option models.[3] Regarding measures at industrial monuments, even maintenance concepts from the production period are usually of little help, since framework conditions and work-life objectives are clearly different from those in a decommissioning phase and operations with new users from service or cultural sector. This problem is aggravated by the fact that a production facility earns money directly, and the investment into maintenance therefore provides a financial return. A culturally utilised property, however, provides income on a different level and is therefore first and foremost a cost factor for the public. This often means that only limited financial resources are invested for maintenance.

Given these circumstances, the hope of unproblematically and comprehensively preserving entire industrial facilities usually soon turns out to be deceptive. This is why the idea emerged in the 1990s to allow a controlled decay of parts of the object/site,

3 Götz, Brüggerhoff, and Tempel, 'Aktionsplan'. A constantly expanding summary of the experience is documented in the *Action Plan for the Management of Industrial Monuments:* https://www.indumap.de/ (accessed 20 December 2022).

letting them 'die with dignity'. Another approach was also born: *industrial nature,* the re-conquest of industrial areas through uncontrolled re-colonisation by plants and animals. Even though this idea is quite successful now, it always contains – in the eyes of the author – a small element of failure in terms of preservation. Sometimes, however, the just-achievable is raised to the level of the extraordinary. In the case of the Landscape Park Duisburg Nord, North Rhine-Westphalia, the *industrial nature* approach became a very popular solution, since the park preservation concept included all the facilities of a former blast furnace plant. The public's acceptance of this site enabled a maintenance concept that takes into account all parts of the property (objects and green spaces).

Concerning huge sites the consistent selection of exemplary and meaningful areas can ultimately become an opportunity to proceed. If not everything can be preserved, selection is necessary. This is certainly not always easy, but it allows for focusing on what is important and what can be achieved. An example of such a decision-making process was realised at the pipeline system of the so-called *comb buildings* of Zollverein coking plant in Essen, North Rhine-Westphalia (a UNESCO World Heritage site). Part of the pipeline routes has been repaired at great expense. This enables the vivid presentation to visitors of material flows in a coking plant. In other places, the corroding tubes are abandoned and only the easily maintained stud frame is left as a guiding feature. At this point, we have to ask whether we are still doing justice to approaching an authentic object. Although the original substances no longer circulate in the pipelines and the industrial object has become a static historical object, the original functions can still be directly understood. However, an ever-increasing abstraction by abandoning supposedly unsalvageable details at some point crosses the boundary at which the object is still meaningful and usable as a historical witness. This boundary is certainly fluid, and must be renegotiated again and again.

Another important approach is a new utilisation for the former industrial buildings. The term 'buildings' indicates that in many cases objects are reduced to an empty shell that can be utilised for a new purpose. Positive examples also consider their former industrial character. Conversion in accordance with preservation aims does not necessarily have to lead to a cultural institution: sites have already been used as office buildings, or for small businesses, storage and event areas. Since a commercial use is achievable here, maintenance for the object is also secured, and thus survival (new life) is guaranteed. A frequent disadvantage of this approach is that former installations within the buildings, which are a decisive part of their industrial character, compete with the need for utilisable space. The consequence is usually a reduction of the plant stock to demonstration examples, which are then only tolerated as 'substitutes' for the former use in the new one.

The exact opposite approach appears where the industrial character of the site is a decisive marketing advantage, e.g. for a landscape park. There, sometimes only striking technical constructions have been left standing. So it may happen that a winding tower is encountered without any relation to the colliery that was formerly accompanying it. On the one hand, such *landmarks* may certainly be identity markers. This is particularly true when initiatives have been formed from the local population in order to preserve

the memory of the lost overall facility. On the other hand, if standing without any explanation or contextualisation, these landmarks may produce misinterpretations that are sometimes irritating in the long term.

All these different examples make clear that any approaches to conservation values should always be combined with very good planning concerning conservation possibilities. If well prepared, the consideration of deliberate monument conservation objectives, technical and financial possibilities, aspects of utilisation and the early involvement of interested parties often guarantee the sustainable preservation of industrial heritage.

Authenticity and material preservation

The specific implementation of conservation measures is another point that should be briefly discussed when talking about authenticity and preservation necessities. The attempt to preserve the object's authenticity collides in some cases with the necessary material protection. The preservation of all traces of an object's work life has been a decisive reason for the author's research on transparent coating materials applied to historical iron and steel surfaces.[4] In the context of these activities, however, a certain relativisation of the absolutely purist conviction became necessary, particularly due to numerous arguments from corrosion experts. The maxim 'Wash me but do not make me wet' is unrealistic. When exposed to particularly damaging influences (e.g. standing water or aggressive, salty media), a transparent coating is doomed to rapid failure. If not maintained frequently, the well-intentioned approach of leaving a historical surface visible is of greater disadvantage for the object than it is of advantage for its authenticity (the presentation of corroded surfaces serves as evidence of the stalemate).

Conservation always requires a discussion of what is allowed: repairing objects with new materials and techniques can be a way of preserving them permanently and under financially viable conditions. The use of screw rivets in contrast to historical warm riveting is just a minor example. This has enabled rapid replacement and repair procedures to be carried out on the pit frame of the author's own facility (the German Mining Museum), procedures which would otherwise – due to the significantly higher effort involved – certainly have been delayed.

In this context, it must always be asked to which condition a conservation measure is to be directed. Since an industrial plant has usually gone through several phases of life and often shows signs of decay when it is taken over, this question is not at all trivial. In most cases, the restoration goal is hardly to achieve a 'shiny' new condition, but neither must the goal be reduced to leaving the corrosion-prone surfaces that have arisen due to a lack of care in intermediate phases. Corrosion protection applied during operation can and should find an equivalent in modern systems – of course with historical awareness – in preservation.

4 Brüggerhoff, 'Was verträgt ein Denkmal?'.

Fig. 2 Corroded detail at the blast furnace of the Henrichshütte in Hattingen, North Rhine-Westphalia.

In addition, reference should be made to another circumstance which must be taken into account with regard to the maintenance of installations: the change in operating conditions after decommissioning. With a few exceptions, such as the Marl Chemical Park, North Rhine-Westphalia, most industrial heritage objects have lost their technical function in the production process. They are merely images of former content. This has important consequences: factors influencing the materials have changed. A blast furnace or a coke battery, but also pipelines for hot media, are no longer protected by the high temperatures of the operation, but are much more sensitive to corrosive decay by everyday environmental conditions. Non-intervention, and thus an authentic surface appearance, may be accepted for the very thick walls of the blast furnace shell (the corrosion rate is very small relative to the wall thickness); thinner cooling flaps, however, can corrode relatively quickly to the point of total loss. Here, intervention by intensive surface protection is required, and measures must be taken which may change the appearance, but which preserve the object as such (Fig. 2).

The problem of changed appearance can also arise during repair measures. The question to be addressed is whether a certain appearance of an authentic former period of the plant may be 'faked'. To illustrate this: restorers applied a protective coating in order to imitate corrosion at the sintering plant of the Völklinger Hütte called 'Lüftlmalerei'.[5] Even more deceptive is a 'rust varnish', with an intended corrosion layer in the upper-

5 Götz and Böcker, 'Let's paint a ruin'.

most part of the coating, which was used on the windrowing tower of the Henrichshütte in Hattingen, North Rhine-Westphalia.[6] Another example is the reproduction of the outer sheathing of thermally insulated pipelines, without any thermal insulation materials inside (as the pipe inside does not transport hot substances anymore), placed above the comb buildings of the Zollverein coking plant.[7] All these measures contribute to the preservation of the remaining original objects and generate a historical appearance. But when implemented, they lead to at least a partial change in their composition or structure. The conservation measures must therefore be very well documented in order not to mislead later generations.

Overall, the manageability of industrial heritage facilities ultimately depends on their maintenance. Here, the ephemerality of the objects is crucial. The idea of 'taking care' and 'taking responsibility' is usually much more sustainable than costly large-scale repair measures occurring only at large intervals. The use of temporary protection systems that are well controlled and renewed in time leads to good results. With regard to preservation feasibility, the idea of a *Builders' Lodge* (normally applied to churches) must be mentioned. With its continuous efforts, and if necessary also with volunteers, long-term preservation can be divided into many small sections, and thus the effort can be distributed onto many shoulders.

Collection and preservation

In the second part of these remarks, a change is made from the fixed object of industrial heritage to the mobile technical asset. At this point, too, some special questions concerning the ability to conserve will be addressed from the author's own practice. Again there is no intention to go into details of technical conservation. These apply in almost the same way as to fixed objects. More attention should be paid to the aspect of selection criteria when collecting further items, due to limited storing facilities. Andrej Quade[8] vividly described the problems facing technological and industrial museums today: evaluation, mass, delocalisation, immateriality, dimensions, conservation and ownership. With regard to the topic of conservation addressed in this article, Quade explains: 'In addition to and with the challenge of *mass,* there is the problem of the special *dimensions* of the exhibits in the museums of technology and industry. The Airbus or the ocean-going vessel are collected, mines and industrial plants are preserved – often tons of weight have to be moved'.

Precisely these aspects of mass and dimensions are constitutive factors that are challenging, and in many cases even overtaxing, the demands made on collecting museums today. This must be regarded as a kind of ephemerality of apparently very stable objects. Following a defined collection concept, the collection should, on the one

6 Conrads, *Conrads Rostlack VI-739909.*
7 Brüggerhoff, Götz and Tempel, 'Erfahrungen'.
8 Quade, 'Handy, Airbus, 3-D-Drucker'.

Fig. 3 Selection by experts: significant objects in the field of modern mining technology as discussed for inclusion in the collection of German Mining Museum Bochum.

hand, ideally reflect the technical development in the specific field as completely as possible and, on the other hand, also incorporate outstanding individual objects of auratic quality (the last machine… the vehicle in which a state guest travelled… the object transformed by a well-known artist… the device that had a special meaning in an accident…). If this is still possible in museums from the 'small' technology sector, houses with large-scale technology easily reach their limits here. The need for storage and the associated costs increase immensely. Thus, selection criteria for objects to be accessed in the collection are sometimes quite strict, accepting the loss of important testimonies.

Having in mind the end of active German coal mining in 2018, the German Mining Museum Bochum, North Rhine-Westphalia, was anxious to complete its collection of modern mining technology since the 1970s.[9] The large-scale mining technology developed during this period could not be included in the museum's collections for a long time, since it lacked corresponding storage space. The consideration of creating a new depot building gave the museum hope of fulfilling this desideratum, at least in part. In cooperation with the mining industry, a very systematic selection of objects was made, which sensibly reflected technological development (Fig. 3).

9 Farrenkopf, 'Ende'.

These considerations led to the requirement of an additional 10,000 m² storage space. The enormous dimensions can be easily explained if one considers that certain mining machines (e.g. drillers, shearer loaders, long wall cutting facilities or energy trains) have dimensions of 50 to 100 m length or even more, and weigh in the range of hundreds of tons. These dimensions must be managed spatially and thus also financially. Later on it was recognised and admitted that the overall concept could not be fully implemented. Space was reduced and thus the selection criteria had to be tightened. An affordable compromise was developed: compression of the installation space, partial use of outdoor space combined with specific protective roofing, and the sharing of the collection with other institutions. Especially the last point enabled the institutions to prevent the loss of a significant number of objects from the past.

These remarks show that in this field, too, conservation worthiness must always be linked to the possibilities of conservation. The 'loss of the authentic' is not only connected with the alteration of the object – it can also result from a decision against its inclusion into a collection for reasons of capacity. A solution approach that the museum itself pursues, as a consequence of this, is the idea of shared collecting (collecting in a network). With the project 'Separate Preservation – Joint Responsibility', a first step has already been taken.[10] The recording of all coal-related mining collections, linked together in a virtual network, enabled much deeper collaboration. In particular, documentation in a joint internet portal, activated in 2017, led to a share of the preservation burden. This will hopefully compensate for the load of excessive demands placed on individual members, through joint group action and a strategic approach. The procedure also includes a conceptual unbundling, or focusing on the core points of one's own work, which should create certain free space in one's own depot. By deliberately handing over to partners, the fear of loss in collection departments, and ultimately the 'loss of the authentic' in museums, can be counteracted.

Concerning all difficulties in preserving large objects of technical and industrial heritage because of the potential impossibility of their inclusion into a museum collection, the topic of *digitisation* also needs to be briefly addressed. Digitisation provides an enormous opportunity regarding otherwise lost objects. It offers the survival of a lot of information, although it is not a full alternative to the physical object. This is also true for objects already within collections. Importantly, the availability of digital information increases accessibility to the objects. The ability to access these data from any place at any time is an immense advantage, and deeply democratic, especially if it can be done free of charge. This technology will allow the objects to become considerably more significant. At the same time, object information is easily shared and discussed, thus ensuring better understanding and exploration. However, in no case will the physical object become superfluous due to the availability of its digital counterpart online. Only the physical object can answer new questions – its digital image merely reflects existing knowledge, albeit fully. Thus, with regard to the cultural value of an object, even highly

10 https://www.bergbau-sammlungen.de/en/ (accessed 20 December 2022).

cost-oriented politicians must recognise that technical heritage cannot simply be disposed of after its digitisation. Objects with significance need to be physically preserved and additionally made digitally available, together with all information. The effort of physical preservation remains a task for society; otherwise, authentic information will be lost.

Conclusion

Conservation value is crucially linked to the ability actually to implement conservation. This is a particular task in the case of technical and industrial heritage objects, which are often of large dimensions and have a history of specific production processes. It is hardly possible to formulate simple standards. Instead, specific solutions are required: reduction to exemplary areas, compatible attempts of utilisation, the acceptance of modern, technical conservation strategies for historical objects, and, above all, joint consideration and a willingness both to deal with the enormous dimensions of objects and to finance the task. All paths to this end have to be taken with a sense of what is appropriate and sufficiently long-term and sustainable. Industrial heritage looks very robust, but is much more ephemeral than might be expected.

Bibliography

Brüggerhoff, Stefan. 'Was verträgt ein Denkmal? – Möglichkeiten und Grenzen eines transparenten Oberflächenschutzes für Industriedenkmäler aus Eisen und Stahl'. *Metalla* 4, no. 1 (1997), 15–19.

Brüggerhoff, Stefan, Kornelius Götz, and Norbert Tempel. 'Erfahrungen verfügbar machen – Vom Aufbau einer Expertenplattform zur Erhaltung von Industriedenkmälern'. In *Industriekultur 2020. Positionen und Visionen für Nordrhein-Westfalen,* ed. by Land Nordrhein-Westfalen, Landschaftsverband Westfalen-Lippe (LWL), Landschaftsverband Rheinland (LVR), Regionalverband Ruhr (RVR), Stadt Dortmund und Stadt Essen, 230–237. Essen: Klartext-Verlag, 2012.

Conrads, Mathias. *Conrads Rostlack VI-739909. Einsatz im Bereich des Hochofens der Henrichshütte in Hattingen*. http://www.conrads-lacke.de/aktuell/images/file/Rostlack%20in%20Hattingen.pdf (accessed 17 August 2017).

Farrenkopf, Michael. 'Das Ende der deutschen Steinkohlenförderung: Eine historische Zäsur?' *Forum Geschichtskultur Ruhr* 2 (2016), 9–12.

Götz, Kornelius, and Alex Böcker. 'Let's Paint a Ruin. The Conservation of the Steel Coal Tower in Voelklinger Huette'. *e-conservation* 11 (2009), 26–35.

Götz, Kornelius, Stefan Brüggerhoff, and Norbert Tempel. 'Der Aktionsplan für industrielle Flächendenkmale – Das Beispiel Kokerei Zollverein' In *Zwischen Rhein-Ruhr und Maas. Pionierland der Industrialisierung – Werkstatt der Industriekultur,* ed. by Walter Buschmann, 221–229. Essen: Klartext-Verlag, 2013.

Land Nordrhein-Westfalen, Landschaftsverband Westfalen-Lippe (LWL), Landschaftsverband Rheinland (LVR), Regionalverband Ruhr (RVR), Stadt Dortmund und Stadt Essen, eds. *Industriekultur 2020. Positionen und Visionen für Nordrhein-Westfalen*. Essen: Klartext-Verlag, 2012.

Quade, Andrej. 'Handy, Airbus, 3-D-Drucker – Technische Gegenwart sammeln. Zur Diskussion in den Technik und Industriemuseen'. *Museumskunde* 82 (2017), 91–93.

Slotta, Rainer. *Technische Denkmäler in der Bundesrepublik Deutschland*. Bochum: Verlag Deutsches Bergbau-Museum, 1975.

Wicke, Christian, Stefan Berger, and Jana Golombek. *Industrial Heritage and Regional Identities*. London: Routledge, 2018.

Software-Based Art Installations as Objects of Conservation: An Adapted Interview

Patricia Falcão and Julia Sawitzki

Abstract

Nearly twenty years after the first ever appointment of a time-based media conservator at Tate, there is still a myth among traditionally trained conservators about the difficulty of understanding and conserving time-based media.

The seeming lack of physical existence of time-based media objects, along with the fast pace of change and development in the digital industry, are both reasons for them being seen as ephemeral in nature, yet these are also characteristics that support their preservation. The preservation of data does impose new challenges on conservators and demands different approaches compared to classical object-based conservation. But is it that different in the end?

Working as a time-based media conservator at Tate over the last ten years, Patricia Falcão is an expert in the field. She kindly agreed to an interview addressing questions concerning the complexity and properties of time-based media conservation. Conservation workflow, storage possibilities, and future perspectives to ensure the preservation of our digital heritage were also topics discussed.

Challenges of time-based media conservation

Julia Sawitzki *Time-based media artworks are not the same as traditional conservation objects.*[1] *In approaching the conservation of time-based media artworks, what aspects can be derived from classical material-based conservation, and what are the differences from it?*

Patricia Falcão Unlike for classical physical art objects, such as a painting, where the object of conservation is a unique object, the object of preservation for a time-based media artwork is not only the media object (nowadays usually one or a set of digital files) but also the ability to perform that object in an authentic way. This refers to how that artwork is displayed in the space, the size, placement and quality of images, sometimes the size and colour of a room, and then how the media is played back or how an artist's software is run. The time-based media conservator's role is to consider all these aspects for each artwork, identify the risks to their performance, and take the steps needed to manage those risks in the long term, through careful storage, equipment management and thorough documentation.

The conservation of these technological performances implies the acceptance that change to those systems will always be required.[2] The acceptable level of change must be planned for, and the later changes managed and documented.

1 Muñoz Viñas, *Contemporary Theory of Conservation;* Laurenson, 'Authenticity, Change and Loss'.

2 Laurenson, 'Authenticity, Change and Loss'.

This means ensuring that, in discussion with artists and curators, the significance of elements is identified, a strategy is defined for replacement or mitigation of deterioration, and thorough documentation is carried out of the original systems, decisions made and levels of acceptable change.

Most of these actions have parallels in other conservation disciplines, and this is especially so in relation to contemporary art.

One aspect that is unique to time-based media is that the media itself is in most cases reproducible, and digital media can arguably be cloned and copied without change or loss of authenticity.

An important caveat is that even though the media is easily reproducible, it still requires safe storage. Museums and collectors spend vast amounts of money to maintain collections in secure and climate-control spaces, but the need for appropriate digital storage is still something that must be advocated for, and not necessarily seen as part of the day-to-day operation of a museum or collection. The good news is that this is changing rapidly, and we are seeing more and more options for both in-house and external archival digital storage, and great work is done by the digital preservation community in defining standards and requirements for the preservation of digital objects.

JS *What are, for you, the greatest challenges for time-based media art conservation?*

PF From my perspective, one of the main challenges is still the lack of understanding of what a time-based media conservator does, and the need for an initial moment of discussion around conservation before an artwork is collected.

We are very lucky at Tate, which has had very clear workflows and processes for acquisition of any artwork for a long time. That has allowed for the development of specific steps for time-based media art since the late 90s, when Tate started to acquire higher numbers of works. These established workflows allow us to address conservation concerns with artists or galleries before an artwork is acquired, which is not always the case in smaller institutions with less in-house expertise. As the first time-based media conservator coming into an institution, one must do a lot of advocacy – for resources, but also to be made part of the acquisition process.

The other perceived challenge is the need to understand a broad range of technologies, their significance for different artists and the risks for their long-term preservation.

It can feel somewhat daunting to be faced with, for instance, complex software for the first time, but it has become easier to find relevant information, and artists and their technical experts are usually extremely savvy about the needs of the technologies they use.

Looking at it from a different perspective, because technology is always evolving, what can at one point in time look like an unsurmountable problem can then have a clear solution ten years down the line. We have seen this, for instance, with video, and the risk that specific video codecs and formats become obsolete.

Through the work of developers and AV archivists, such as Dave Rice and Jerôme Martinez at Media Area Net,[3] technical knowledge around digital video and the tools needed to assess digital video are now easily accessible to non-experts. This means that the risk of obsolescence of digital video file formats is now much easier to address and manage.

JS *So, since it is a contemporary material, there is a lot of persuasion to do, which is a topic for many modern and contemporary materials and objects.*

Systems and workflows

JS *You already mentioned the defined processes at Tate: What are the typical processes if there is a new time-based media artwork coming in? What is the current workflow?*

PF The process by which an artwork comes into the museum and is displayed involves a multitude of different people and departments at Tate. Usually, it starts with the curatorial team defining the acquisition priorities, e.g. which artist or artworks they are interested in. After the selection, they will communicate with the artist or the galleries. At this point, time-based media conservation is involved. We produce a pre-acquisition report, and for that we must engage with the artist or the vendor of the artwork to ask questions about how an artwork is produced and how it should be displayed; this can sometimes be followed by a thorough, conservation-focused artist interview.

This is often the first time you are talking to an artist, and what I've found is that it is helpful to explain that the aim of this sometimes longwinded process is to understand how best to care for their work in the long term, what we need to do to reduce risk, and how a work should be displayed.

After this initial conversation, we start the accessioning process, where we do a more in-depth investigation of the media, the hardware requirements and the display requirements of each artwork.

At this point, and based on the initial conversations, we may propose which materials we would like to receive: for example, for early video works, we often ask for access to the original video tapes, as we work with expert video labs that can still play obsolete video formats and create digital files with our preferred specifications.

Another recent example was during the acquisition of a software-based artwork, where we knew how the artwork had been produced, and knew that it would be easy for the artist to create different executable files. Besides the executable for MacOS, the artist kindly agreed to create executables to run on Windows and Linux. The operating system was identified as a dependency for the software, and MacOS has some restrictions that mean there is a bigger risk that we won't legally have access to a compatible version of it in the future. Because we now have the option to run the software in at least three different operating systems, the risk that we would not be able to run the software in the future is much lower.

3 https://mediaarea.net/ (accessed 20 December 2022).

This is something we do at that stage: we look at risks and try to mitigate them.

Once all the materials are received we then add them to our collection management system, TMS (The Museum System, by Gallery Records[4]), so that all the components of the artwork are clearly listed and their location can be tracked.

Those components are then safely stored: media carriers, equipment and sculptural elements in a controlled environment in our art stores, and then copies of the digital files in our digital storage.

For digital files we have adopted many procedures from the digital conservation community, to ensure that a file doesn't change during the transfer or copying processes, for example, while copying a file from an artist's hard drive to our digital storage.

We create checksums: algorithms that produce a value that can be compared, so we know that if the value changed, then the file changed. We also analyse and extract the technical metadata for each file, so that we know which formats we have in the collection and can manage those formats in the long term as well. We also have media-specific quality control steps.

JS *What are those steps?*

PF For video, at a most basic level we play back and watch the files. We also compare the metadata from the files we have with the information initially provided by the artist or vendor. For instance, an artist will say that they will send us a file in the QuickTime format, and encoded in ProRes 422, with stereo sound and HD resolution. We then use tools such as MediaInfo and QCTools to confirm that the file we received does indeed have those specifications, and if it does not we go back to the artist to understand why there is a disparity.

In most cases we get what we expected, but sometimes people make mistakes – we have received files that were not the work we were acquiring a couple of times, or sometimes there was a problem with a file that went unnoticed. When condition-checking a video file, we look for image errors and any problems with the compression of the image. Sometimes these are a characteristic of the production process and are accepted by the artist, but sometimes it is an oversight.

If the artist is aware of the issue and not concerned, then that is not a problem.

For software the process of condition-checking can be a lot more involved.

The interesting factor about software is that even if an artist's software is running, you may not know if it is running correctly. A software may run, but not behave as the artist expected.

To obviate this issue most artists supply a computer with the software installed, so they know it is running correctly. If that is not the case, we must install and run the software, and check with the artist that it is running as expected.

This becomes our basis for comparison, so we then create copies, both hardware and software, and compare them running against the artist-approved version.

4 https://www.gallerysystems.com/ (accessed 20 December 2022).

If consistent with the production process of a work, we will request the source code for the software, or we may request project files.

If a certain tool is being used to produce the software, we might also ask for a copy of it, if it is free. It is always a good idea to clarify why you need certain information and what you are using it for.

All the data and information gathered is copied and stored in the appropriate systems, be they digital media in digital storage, component metadata in TMS, or other documentation in artwork folders.

In preparation for a display of the work, this information is then accessible, so that we can plan how the work can be shown in the galleries. Often display parameters will vary depending on the space or the context, and it is then part of our work to document that variability as well, which we do with the use of iteration reports,[5] drawings and correspondence or communications with artists and curators.

Current practice and future perspectives for time-based media conservation

JS *What is the current position of time-based media conservation at the Tate?*

PF Over the last ten years our team has grown, reflecting the increase in the number of time-based media artworks being acquired and displayed. My manager, Louise Lawson, has played a crucial role in gathering the data and advocating for enough resources and enough staff.

It is also helpful that Tate's curatorial team and the institution in general wish to increase the representation of digital art in the collection and also on display.

The opening of the Blavatnik building at Tate Modern in 2016, with the increase of gallery space, meant that more people were needed to plan, install and maintain time-based media artworks. That meant that four new members were added to our team.

The best part of the job, in my opinion, is that in order to collect new materials, new formats or new technologies, research becomes an inextricable part of the job, and this can be seen in the work that is being developed by different members of the team. Over the last few years, my colleagues Jack McConchie and Tom Ensom have been engaged in a project about the preservation of immersive media, with the support of the Lumen Art Projects.

I have been researching the preservation of software-based artworks since 2008, and as part of the project Reshaping the Collectible[6] have been investigating the preservation options for web-based art, in collaboration with my colleague Chris King and the team of the project.

5 Philips, 'Reporting iterations'.

6 'Reshaping the Collectible: when Artworks live in the Museum' is a multi-year project funded by the Andrew W. Mellon Foundation and led by Professor Pip Laurenson. The project is contributing to theory and practice in collection care, curation and museum management, and focuses on recent and contemporary artworks which challenge the structures of the museum, with a particular focus on time-based media, performative, live and digital art.

Also as part of the Reshaping the Collectible project, Louise Lawson and Ana Ribeiro have had the opportunity to research the documentation and preservation of performance art.

The project has been an opportunity to collaborate with different parts of the institution, from the archives to the registrars to conservation. It follows on from a series of other research projects that have happened at Tate during the last five years around digital preservation and performance, such as the Collecting the Performative project,[7] which looked at the challenges of collecting performance art, and the European-funded Pericles project, which focused on aspects of digital preservation.

JS *There is the aspect of the development of time-based media. What are the main goals or problems that need to be addressed in the future*?

PF I think the biggest technological challenge coming our way are all these objects that are not contained anywhere, objects that have no boundaries. I was talking to a digital design curator who was discussing the implications of collecting Amazon's Alexa.

You can keep the physical object, and the form is interesting as design. But what is relevant about it is what it does, and that is dependent on a vast network of information that can't be easily captured. It's behaviour that is almost impossible to recreate, because it is targeted at a user's preferences and usage, but that information relies on Amazon maintaining it online. At the moment we don't have a work that uses technologies like Alexa, but eventually we will, and it is quite mind-blowing. So that is something to look forward to in the near future.

JS *Last question: What advice would you give to museums that want to start with time-based media conservation? What are the most crucial points?*

PF You need a conservator that can focus on the medium. Nowadays there are people who have studied and trained in time-based media, or you can support an engaged individual to learn on the job. In either case, they need the time and focus to do the job; it can't be just something someone does on the side. You cannot ask your paper conservator to go and have a look. The museum needs to invest in someone and make sure that that person has the training they need.

The other aspect is to make sure that you can commit the funds to preserve those works. Digital preservationists talk about the preservation of digital objects as being ongoing: these objects must always be in the process of being preserved. They can't just be put away for twenty years and forgotten about.

The resource issue can be difficult, as we need to support institutions in collecting time-based media. Even if only a minimum can be done, even if what is left of an artwork is only a hard drive on a curator's desk, an entry with an image on an online catalogue. It is still better than not having been collected at all.

7 https://www.tate.org.uk/about-us/projects/collecting-performative (accessed 20 December 2022).

If you are a well-off museum, then you need to invest in the people and the processes and the infrastructure for preserving these types of works, which are such an important part of contemporary culture. In my view, that is the key point.

Patricia Falcão and Julia Sawitzki, interview conducted in May 2019.

Resources

The Matters in Media Art's website: http://mattersinmediaart.org/ (accessed 20 December 2022) – for more information about preservation of time-based media.

The Digital Preservation Coalition's website: https://www.dpconline.org/ (accessed 20 December 2022) – for specific information on digital preservation.

Tate Museum. *Reshaping the Collectible: when Artworks live in the Museum.* https://www.tate.org.uk/about-us/projects/reshaping-the-collectible (accessed 20 Decemeber 2022) – with information about the ongoing project at Tate.

Tate Museum. *Preserving Immersive Media.* https://www.tate.org.uk/about-us/projects/preserving-immersive-media (accessed 20 December 2022).

Bibliography

Engel, Deena, and Joanna Philips, eds. Conservation of Time-Based Media Art. London: Routledge, 2022. doi: 10.4324/9781003034865.

Ensom, Tom, Patricia Falcao, and Chris King. 'Software-Based Art Preservation.' London: Tate, 2017. https://www.tate.org.uk/about-us/projects/software-based-art-preservation.

Falcão, Patricia. 'Another Case of Uncomfortable Prximity? Keeping Web-Based Art Online at Tate.' London, Tate: 2017. https://www.tate.org.uk/research/reshaping-the-collectible/net-art-uncomfortable-proximity-keeping-web-based-art-online.

Laurenson, Pip. 'Authenticity, Change and Loss in the Conservation of Time-Based Media Installations'. In Tate Papers 6 (2006). https://www.tate.org.uk/research/publications/tate-papers/06/authenticity-change-and-loss-conservation-of-time-based-media-installations (accessed 20 December 2022).

Muñoz Viñas, Salvador. *Contemporary Theory of Conservation*. Oxford: Routledge, 2005.

Philips, Joanna. 'Reporting iterations, a documentation model for time-based media art'. Revista de História da Arte 4 (2015), 168–179. http://revistaharte.fcsh.unl.pt/rhaw4/RHAw4.pdf (accessed 21 December 2022).

Digital Cultural Heritage and Musical Performance

Digitisation and Restoration of Historical Audio Recordings: A Tightrope Walk between Authenticity and Manipulation?

Nadja Wallaszkovits

Abstract

The paper outlines the importance of accurate and proper handling and treatment of historical audio recordings in the context of their digitisation and restoration. A wide knowledge about the original source and its production process, artistic intentions, storage conditions and re-recording influences is essential to properly decide if and how artefacts should be restored in a historically and ethically accurate way. Starting with a critical assessment of the source material and its artefacts, the discussion addresses various questions regarding the authenticity and manipulation of digitised and restored audio content, compared to the analogue source material. As an example of the highest complexity, the digitisation process of the Oskar Sala collection is outlined, including the various challenges of this project, the parameters and practical problems of the audio transfer, as well as the strategy for safeguarding the richness of the metadata using multi-media-based documentation, such as photographic capturing and high-definition video recording.[1]

Introduction

The digitisation and restoration of historical audio material is a sensitive and highly specialised task, requiring a special sense of responsibility, especially if originals of valuable and unique archival holdings are involved. Nowadays, the transfer of analogue audio recordings into the digital domain is in many cases handed over to service providers, with the aim of performing this process in the fastest and most economical way. Usually this process of reformatting is realised as a mass transfer and automatically quality-checked by dedicated signal analysing tools.[2] A large quantity of media can thereby rapidly be made accessible in a very efficient and useful way. For most of the sound materials held in archives, this method is adequate and very convenient. However,

1 Larger parts of Section 'The Oskar Sala Collection – a special challenge' have already been published in German (Wallaszkovits, *Audio goes Video)* as a contribution to the annual meeting of the *International Association of Sound and Audiovisual Archives* (IASA) in 2009.

2 E.g. Cube-Tec International GmbH, Bremen, Germany (manufacturer): AudioCube, https://www.cube-tec.com; MediaServices GmbH, Salzburg, Austria (manufacturer): AudioInspector, https://www.audioinspector.com; NOA GmbH, Vienna (manufacturer): NOARecord, http://www.noa-archive.com/products/archive-transfer-technology/audio-transfer/noarecord/ (all accessed 5 March 2019).

since human intervention is reduced to a minimum in conventional mass transfer, usually no special care can be taken in the choice of measures and their implementation concerning proper treatment of historical source materials. Once in the digital domain, many relevant procedures are technically impossible and can no longer be performed, as the analogue carrier is necessary to proceed. In practice this means that, in a conventional digitisation transfer of analogue audio contents, some technical information is inevitably lost. Within this context, the question of authenticity is vital: both archives and museums are repositories for original items. For various reasons, such as providing access and facilitating the use of their holdings via the internet, the originals are transferred into a digital copy. While copies are useful working tools which help preserve the originals by minimising their handling, they can never fully replace the originals. This fact seems obvious concerning museums, e.g. it is clear that even a very high-resolution photograph of a sculpture will never be able to replace the physical object. But it is less obvious in the case of digitising audio recordings, as many losses are inaudible, invisible or very difficult to trace. Therefore, information contained in the original can get lost in the digitised file, due to a lack of contextualisation or technical knowledge, or even unconsciously.

As long as the originals are still on their shelves, one can always use them to verify metadata or content. But time is running out, because the carrier materials are inevitably decaying, replay equipment is becoming rare, and knowledge about the technologies involved is rapidly shrinking. Are we able to maintain the authenticity of the original recording for the next generations in the digital domain, or do we have to assume that we are losing information? How can we avoid the risk that manipulation – perhaps carried out due to the lack of information, proper documentation or even unconsciously – may become an everyday fact?

Audiovisual media as information carriers or museum objects?

The world of audio production, dissemination and archiving defines audiovisual media as information (data) carriers.[3] The information is stored in various technical representations, e.g. in analogue, digital, mechanical, magnetic, optical forms, etc., with the intention that it be shared and disseminated at a later stage. Since recently, this process is carried out in the digital domain and it is digitisation that, for the first time in history, allows lossless copying for future digital generations. But this process also needs a reformatting of the information, by extraction from the original physical carrier, via analogue-to-digital (A/D) conversion into a digital file format. This transfer process is crucial for the quality and, within a wider context, also for the authenticity of the item that is digitised.

If information is intended to be shared, e.g. via various dissemination channels such as open access platforms, it should be provided in a way which allows everybody to

3 IASA Technical Committee, *IASA-TC 03;* IASA Technical Committee, *IASA-TC 04.*

receive the same level and quality of information. In the field of audio technology, there have always been technical limitations caused by various signal losses, e.g. the loss of quality by copying from one analogue carrier to another analogue carrier. Therefore, defined rules on how to produce, copy and disseminate audiovisual carriers are important prerequisites to receiving the same level and quality of information in general. As a matter of fact, with only a few exceptions (e.g. still photographs), audiovisual storage media are machine-readable information carriers, and even documents in perfect condition would be useless without dedicated replay machines. Already in the early days of audio recording technology, this led to the development of technical standards.

Technical standards were developed to meet the needs of the professional, the commercial and the consumer worlds, concerning equipment, recording and reproduction of analogue audio material. A comprehensive summary of international developments can be found in the Journal of the Audio Engineering Society.[4] Generally, it can be stated that the biggest part of the audiovisual holdings worldwide has been produced with the intention to be listened to under conditions given within the applicable standards of the respective time period. Therefore, when sound recordings are to be transferred into the digital domain for access and long-time preservation reasons, it can be assumed that the transfer parameters for playback of the particular sound recording should meet the standards of the time period of production. This assumption can already create a number of problems, e.g. when the equipment used for production is unknown or when metadata about the origin and dating of the source material is not available. But in general, digitisation of such holdings produced under standard conditions allow for choosing a mass migration strategy which is characterised by the maximum automation of parallel ingest signal streams in combination with software-based automatic quality control features. Many millions of audiovisual media have already been transferred from analogue to digital and thus made accessible with today's technology. Furthermore, dedicated recommendations and best practices have been developed to define the requirements of such a reformatting process as well as possible.[5]

So far, hardly anyone has questioned the authenticity, integrity and completeness of the information that is provided by such an approach, although certain drawbacks are well known. For example, some information is lost in a conventional A/D transfer from analogue magnetic tapes, such as the high-frequency bias signal.[6] The user can only accept such a transformation, not only because many of these losses are inaudible (as the high-frequency bias signal is located far above the human audible range), but also because the comparison between the digitised signal and the sound of the signal retrieved from the original analogue carrier is usually not possible – this would require creating a non-trivial reference situation for accurate analysis.

4 Nunn, 'Standards', 74–76, 78, 80, 82, 84–86.

5 Such as IASA Technical Committee, *IASA-TC 03;* IASA Technical Committee, *IASA-TC 04;* Brylawsky, Lerman, and Pike, *ARSC Guide;* Casey and Gordon, Sound Directions.

6 Wallaszkovits, Pavuza, and Pichler, *Method Comparison.*

But aside from such holdings, usually comparatively homogeneous, that allow a mass migration process, a number of exceptions exist. Information on audiovisual carriers could have been processed without following the set standards for a variety of reasons, including unintentional signal alterations or as a compromise for materials that had been produced in a time period before standards had been developed for the individual recording format (pre-standardisation), or if unintended errors like machine misalignment, irregular conditions, etc. have influenced the signal quality. Sometimes, signal alterations are intended, and comprise modifications of the original, e.g. in the use of noise reduction systems.

But besides technical reasons, there are several more exceptions that may lead to information on audiovisual carriers being produced without following the standards: to produce audio recordings exceeding the standards in terms of technical quality – and these are artistic reasons! In some cases it is the intention of the sound recordist to produce material that exceeds or ignores the standards in terms of technical quality – mostly to artistically improve the sound impression. Such examples can be found in media art, where 'glitch music' and 'glitch art' have become accepted terms.[7] Len Lye (1901–1980), Nam June Paik (1932–2006), John Cage (1912–1992) and many other famous artists are the pioneers of this genre. In such cases, the task of reformatting the original medium to a more stable and more accessible format, such as a digital file format, involves making highly demanding decisions and developing sophisticated strategies. A transfer according to well-established standards could falsify the original impression and intention, and in the worst-case scenario even destroy the work of art. Even worse, the 'restoration' of artistically intended signal manipulations to a technically correct signal without glitches, clicks, distortion etc. would lead to a falsification of the intended artistic sound manipulation.

Therefore, when performing the task of reformatting, i.e. transferring analogue audio material into the digital domain, the dilemma of choosing between authenticity and manipulation may quickly arise, especially when it comes to the digital processing of historical sound materials. This process is widely known as 'digital signal restoration' for various purposes, be it editing, public performance, creation of user copies, etc. With every single processing step, new questions arise, such as: what is the quality of the signals? Where does each artefact come from? How should it be treated? Are certain technical procedures allowed? What might be withheld from the listener? How might users be influenced by the restoration process? Who is the public – historically interested persons, people familiar with archive material or inexperienced consumers of modern productions? How should the sound material be presented to the public? What effects does the processing subsequently have on the scientific evaluability of the material? Last but not least, why is the signal processed at all?

The search for answers opens up a very extensive area with various contexts, in which the restoration process inevitably starts at the analogue level, by addressing the storage

7 Kelly, *Cracked Media*.

and ageing of the sound carrier, followed by tackling questions of reproduction and transfer, and the various decisions factors involved. Unfortunately, sometimes the decisions taken are undocumented or difficult to understand.

It can be summarised that in general, the vast majority of sound recordings are not works of art per se, but the information they carry can very well be artistic works. Nevertheless, many obsolete sound carriers have reached cultural significance sometimes far beyond their content in view of their technical-historical relevance.

In certain rare cases, not only the contents, but also the sound carrier itself has been artistically modified. As such, the sound carrier also achieves the status of an artwork. One example of this can be found within the collection of the famous German pioneer of electronic music Oskar Sala,[8] which will be outlined in the following sections.

The Oskar Sala Collection – a special challenge

Oskar Sala (1910–2002) was a German musician, scientist and composer as well as one of the pioneers and most important protagonists of electronic music. He played and further developed the Trautonium, an instrument invented by Friedrich Trautwein (1888–1956) in Berlin at the end of the 1920s. This instrument is considered a predecessor of the synthesizer. Sala's highly modified and elaborated Mixtur-Trautonium in particular allowed the creation of a large variety of unique and novel sounds. With his creative compositions, Sala anticipated a lot of well-established film sounds and musical expressions. On the Trautonium, Oskar Sala created the score and sound effects for over 300 films, including the terrifying birdcalls in the soundtrack for *The Birds* (1963) by Alfred Hitchcock (1899–1980), besides sounds for theatre, radio, advertising and autonomous musical works. He received several patents and many awards for his outstanding work.

After Sala's death, almost his complete artistic legacy was transferred to the archive of the Deutsches Museum in Munich. Almost all the documents, sound carriers, and equipment that originally stood in his studio in Berlin's Heerstrasse have been preserved. The entire inheritance represents an important collection that illuminates aspects of cultural, film and technical history as well as the development of electronic music. The inheritance of Oskar Sala contains around 1,800 sound carriers and films, of which around 1,200 are analogue magnetic tapes with sound recordings. Since Sala did not regularly record notes for his productions, the tapes represent unique sources for the documentation of his creative life's work.

Oskar Sala fully exploited all the possibilities of analogue tape technology, using impressive experimental approaches. His tapes have become artworks themselves, as they comprise a unique richness of very special and specific metadata: most of the tapes are cut up to 200 times per reel, and nearly all of the short separation tapes, as well as the backside of the tapes, are filled with manually written notes which are more or less

8 Berdux, Wallaszkovits, and Füßl, 'Audio goes Video'.

readable. Such and many more surprises make an adequate safeguarding and digitisation of the collection a unique undertaking. The collection has been successfully digitised, financed by KUR – Programme for the Conservation of Moveable Cultural Assets (Germany) and in consultation with the Phonogrammarchiv of the Austrian Academy of Sciences in Vienna.[9]

Strategies for long-term preservation and usability

It was in December 2007 when the first contact between the Deutsches Museum and the Phonogrammarchiv of the Austrian Academy of Sciences was established, with the aim of working out a concept for the planned long-term preservation and usability by digitisation of the magnetic audio tapes from the inheritance of Oskar Sala. At that time, nobody could foresee the large number of special challenges that the digitisation of this exceptional collection would pose. It quickly became clear, however, that the project could not be handled via mass digitisation because a wealth of very special and unique metadata had to be secured. These very special metadata did not allow the use of standard methods for capturing, but required a new, state-of-the-art concept.

Collection assessment – technical aspects

An initial informative and exploratory telephone call was followed by a visit to the Deutsches Museum Archive in spring 2008, with the aim of assessing the magnetic tape collection from a technical and transfer-related point of view. After a brief overview, the focus was set on a detailed first examination of Oskar Sala's tape recorders and their technical specifications. The aim was to identify valuable information about the recording formats Sala had used when creating his collection, as well as the parameters and equipment needed for digitisation, thus making it possible to estimate the effort involved in this project.

The examination of the original equipment showed that Oskar Sala used only professional quarter-inch tape recorders with the magnetic layer reversed (the historic German way of tape guiding, so-called 'B-wind') from the manufacturer AEG-Telefunken with full-track or professional stereo heads (0.75 mm separation track, so-called butterfly heads) since the beginning of his recording activities in the 1940s. However, this did not necessarily exclude other track formats, since tapes may have been taken from second-hand sources, or copies, etc. Unfortunately, many of Sala's tape machines were (and still are) either very old or in an unplayable condition (parts are missing, the devices are partly incomplete) and show strong traces of wear and tear. In addition, various inscrip-

9 This and further extensive information can be found on the website of the Oskar Sala Fund of the Deutsches Museum Munich, http://www.oskar-sala.de/, as well as on the website of the German Federal Cultural Foundation, https://www.kulturstiftung-des-bundes.de/en/programmes_projects/heritage_and_education/detail/preservation_of_oscar_salas_audio_tapes.html (accessed 20 March 2019).

Fig. 1 A typical magnetic tape of the Oskar Sala Collection: loose, stepped wrapping, countless cuts and glue areas.

tions have been applied to the machines (speed indications, 'E' for input and 'A' for output, etc.). This first sign of modifications and handwritten metadata on the item of interest itself became an important hint for the further examination of the collection. It turned out that Oskar Sala did not only further develop and improve his musical instruments, but also his recording devices. However, as he had worked in a highly professional international studio environment, it can be assumed that the tapes could also be reproduced under standard conditions. An initial overview did not reveal any particular problems concerning the formats and parameters. Therefore, after an estimation of time and costs for gaining playability of his own machines it was decided that a transfer with more modern machines of the latest generation was preferable, in order to stay in line with technical recommendations, such as the specifications given in IASA-TC 04.

Collection assessment – preservation status and workflow

In order to get a better impression of the physical preservation status of the tapes, as well as to calculate costs and duration, several sample tapes were examined and digitised in the Phonogrammarchiv in Vienna, with the objective of determining the relevant technical parameters, and particularly to evaluate their state of preservation. For this purpose, the original tapes were evaluated in the archive rooms of the Deutsches Museum, and subsequently a number of representative samples for test digitisation in Vienna were selected. Despite the large number of existing cuts and glued areas, the tapes used for the test digitisation were basically in a good state of preservation. However, the tapes suffered from adhesive leakage and several splicing tapes flaked off during rewinding. These parts were treated and re-glued with appropriate care (Fig. 1).

The determination of the replay parameters was one of the main goals within the scope of the test digitisation. The assessment of the recording devices showed the common range of the standard speeds with a majority of recorders running at 19.05 cm/s and 38.1 cm/s, or rarely 9.5 cm/s and 76.2 cm/s.

However, Oskar Sala had at his disposal one of the earliest continuous speed control devices.[10] With the help of this speed controller, the speed of the tape could be infinitely adjusted while the playback pitch remained the same, and the time-stretched result of the individual sound could be recorded, for example, on a second tape machine, then mixed with other signals, and so on. The speed could also be controlled by a second tape machine. This was used, for example, to precisely adjust sounds or music to the length of film passages. It was unclear how this speed control was used by Oskar Sala and even a time-consuming, more precise analysis of the original tapes would not have given more information. Therefore, a replay of the tape at standard speeds was considered accurate.

Nevertheless, even the choice of the correct standard playback speed was often not clear a priori, above all because noises and 'sounds' sound plausible at several standard speeds. Therefore, it was necessary to determine the tape speed using different methods, such as listening with the hope of clearly recognisable signals (speakers, announcements, etc.) or analysing the mains hum or the high-frequency pre-magnetisation – a method which quickly reaches the limits of readability and usability.

Other parameters, such as the replay equalisations resulting from the devices, were assumed to comply with standard equalisation of the corresponding device generation. To verify this assumption, however, it would have been necessary to determine the reproduction frequency responses of all tape recorders, provided that they could still be brought into a playable state, by means of appropriate reference tapes and measurements. Due to the poor condition of some devices, but also due to the fact that the Oskar Sala inheritance contains circuit diagrams revised with handwritten modifications, this was not possible without extensive, time- and cost-intensive analysis, measurement and repair measures. In practice it was decided to accept standard equalisation and, in the event of a possible deviation, to correct the digitised signal subsequently in accordance with the values to be compensated.

Oskar Sala fully exploited the possibilities of analogue recording technology with tape recorders in order to achieve the desired effects and modulations of the sound. However, since he worked for professional studios, the standardised parameters of the respective device generation were adopted for the time being.

10 Eltro Heidelberg / Typ MLR 38 / 15 / Nr. 63.001 / 101. See also Springer, 'Ein akustischer Zeitregler'.

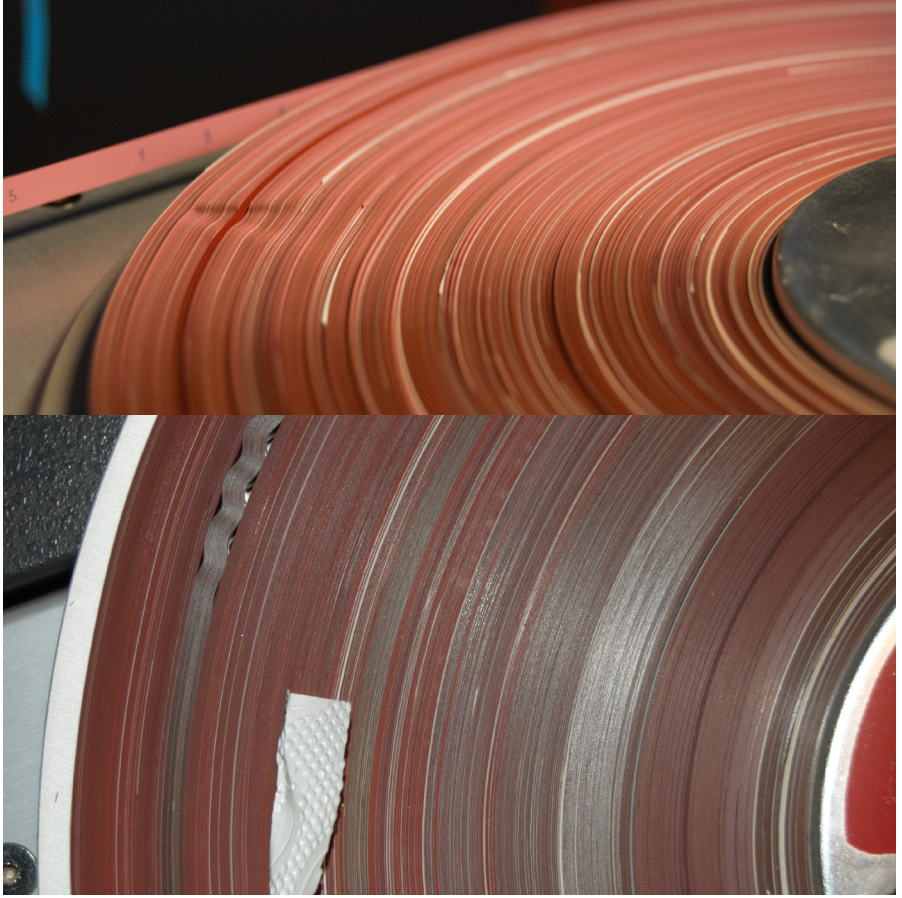


Fig. 2 Different ageing phenomena and deformations within one magnetic tape.

The tapes and their specific metadata

The tapes were cut up to more than 200 times per item, and most of the individual sound effects were separated by the use of short pieces of leader (separation) tape. In many cases different tape types and materials were assembled on one reel. This also resulted in different ageing phenomena on a single tape pack (Fig. 2).

However, the most specific surprise of this collection showed up while replaying the tapes and watching their back side. The tapes contain an extraordinarily large number of specific metadata, which are unique and exclusively present on the original carrier. In addition to the countless cuts, the most obvious additional information Sala often left behind in his tapes are time stamps in the form of small, often inscribed pieces of paper, strips of adhesive tape, and sometimes even stamps (Fig. 3a, b).

This information is lost if it is not properly recorded, i.e. the position of the time stamps must be recorded during the first rewinding process (after determining the correct tape speed, taking into account that this could change several times during the length of the tape) in order to be ideally available as a time marker in the digital file.

Fig. 3a, b Time markers in the windings of the tapes. The picture below shows a tape containing Hitchcock's Birds sound effects.

However, the composer's way of working held many more surprises. Oskar Sala used the tapes practically as a notebook: some details, although often difficult to read, are at least clearly recognisable from the outside, such as the markings on the tape hubs (Fig. 4).

Other markings are only visible during replay: The majority of the separation and leader tapes contain markings unfortunately not always in a readable form (Fig. 5).

This unique kind of handwritten metadata is very important for the identification of the material, as well as for the study of the composer's working method. Therefore, they have to be captured during digitisation. The manual recording of these notes was extremely time-consuming and often subject to interpretation. A purely written recording of the text content of these specific metadata was definitely not sufficient.

Fig. 4 Metadata on the tape hubs.

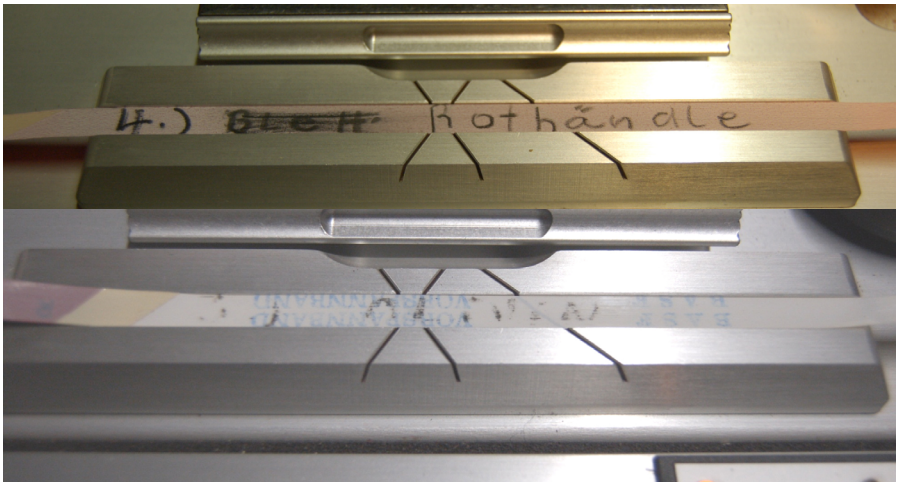


Fig. 5 Metadata on a separation tape, in readable and less readable forms respectively.

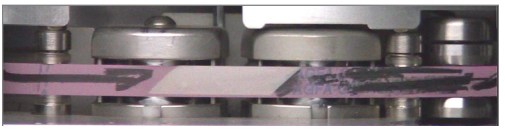


Fig. 6 Oskar Sala's individual markings on a tape.

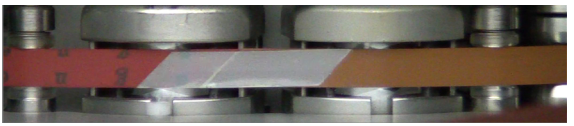


Fig. 7 Rotation of the layer to achieve a damped, mystical sound.

To further complicate matters, Sala very often used individual markers and signs for time stamps, actions in the sound synchronisation points, etc. (Fig. 6).

The recording of metadata does not become easier if one finds out that the composer did not only cut, glue, inscribe and mark the tape itself, but also influenced the sound by manipulating the tape material! This was done, for example, by reversing the layers in order to achieve a mystical sound through the damping of the material. Some such manipulations can be found in the middle of pieces of music, some as individual cuts (Fig. 7).

In addition, further surprises showed up, such as adhesive tapes applied on the layer side and cut into special shapes to achieve special effects (such as fades, crossfades, etc.) (Fig. 8).

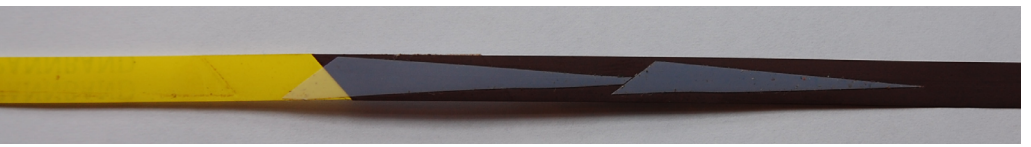


Fig. 8 Wedge-shaped cut pieces of adhesive tape attached to the layer side to achieve special effects.

Many more such fantastic arrangements exist and provide an insight into the composer's unique way of working. The tapes are thus much more than simple sound carriers; with their special representation and their unique manipulations, they practically form works of art in and of themselves.

A conventional and also logical restoration approach would certainly lead to turning the 'wrong side' of the tape to the technically correct layer, and would also remove the splicing tapes from the tape surface. In this exceptional case, both measures would destroy artistic manipulations.

Videographic capturing of the specific metadata

For the long-term preservation and digitisation of the collection, handling and appropriately archiving the originals (rewinding of the material, relocation using acid-free, basic buffered cartons as well as non-corrosive winding cores or reels, etc.) means a compromise between the physical long-term preservation of the tapes and the preservation of the original condition.

The key to these measures therefore lies in the comprehensive documentation of all metadata. In order to meet these requirements, a concept has been developed which, among other things, comprises the following steps:

- Photographing the tape in its original state;
- Recording the positions of the paper time stamps as markers in the file;
- Recording the handwritten marking on the tapes and separation tapes as markers in the digital audio file;
- Recording all speed changes, layer changes, markers, manipulations and other signs of processing as markers in the digital audio file;
- Recording inscriptions, cuts and manipulations by videographic documentation of the tape during the playback process.

To capture all these phenomena adequately, the back side of the original tape was filmed during the playback/digitisation process as it passed the sound heads. This recording was stored as a digital video file, with the sound synchronised accordingly. By using the video documentation method, all metadata attached to the back are comprehensively captured and saved for the future, regardless of the lifespan of the original carrier. This procedure allows the metadata to be made available for future evaluations without access to the original tape, thus enabling subsequent processing and identification of the recordings. Possible misinterpretations due to the extreme density of the information and its sometimes difficult legibility can thus be avoided. By providing the optical representation of the tape during the playback process, a deep and far-reaching insight into Oskar Sala's working method can be obtained on the one hand, while on the other hand it also represents an excellent analysis of the preservation status of the collection.

The video format had to provide a very high resolution with the lowest possible compression artefacts in order to be able to display the metadata in high quality. A convenient video format available at the time of the digitisation of this collection was H.264 MPEG 4 with 50 fr/s. The test recordings have shown a good resolution even at high tape speeds. However, the illumination was critical, as not only must it be very bright, but it also must not generate strong heat, in order to protect the originals. Therefore, daylight panel lights based on energy-efficient fluorescent tubes were chosen (Fig. 9).

Fig. 9 The setup for recording and digitising the tapes.

Summary

With its unique wealth of metadata, the Sala Collection is a very special collection, and the value of this collection must in no way be diminished by non-accurate digitisation or restoration. Since the digitisation of the holdings aims not only at the usability of the audio content, but primarily at the professional and long-term preservation of this central part of Oskar Sala's inheritance, a simple copying for the utilisation of the audio content was not sufficient and would even have been harmful for certain specific information (time stamps would be lost forever without documentation of their position). Since the metadata is relevant information for the identification of the content, it was indispensable to capture and save them within the framework of digitisation, in order to preserve the carrier and its context. Multimedia techniques provided the adequate tools, and the motto for long-term preservation of this metadata richness was: 'Audio goes video'! The collection has since been successfully digitised and is fully accessible at the Deutsches Museum in Munich.

This outstanding example clearly shows the importance of accurate and proper handling and treatment of historical audio recordings in the context of their digitisation and restoration. A wide knowledge about the original source and its production process, artistic intentions, storage conditions and re-recording influences is essential to properly decide how or if at all artefacts should be restored in a historically and ethically accurate way. The balancing of all these factors is important: in this special case, a traditional approach for restoration and digitisation, even if very well performed, would have been harmful for capturing the authenticity of this very specific and unique collection.

Bibliography

Berdux, Silke, Nadja Wallaszkovits, and Wilhelm Füßl. 'Audio goes Video: Ein Projekt zur Digitalisierung von Tonbändern aus dem Nachlass von Oskar Sala'. *Der Archivar* 64, no. 01 (February 2011), 66–72.

Brylawsky, Sam, Maya Lerman, and Robin Pike, eds. *ARSC Guide to Audio Preservation.* Eugene and Washington: Association for Recorded Sound Collections, Council on Library and Information Resources, and The Library of Congress, 2015.

Casey, Mike and Bruce Gordon, eds. *Sound Directions. Best Practices for Audio Preservation.* Bloomington, USA: Indiana University, 2007.

IASA Technical Committee. IASA-TC 03. *The Safeguarding of the Audio Heritage: Ethics, Principles and Preservation Strategy,* ed. by Dietrich Schüller. 3rd edition. 2005.

–. IASA-TC 04. *Guidelines on the Production and Preservation of Digital Audio Objects: Standards, Recommended Practices and Strategies,* ed. by Kevin Bradley. 2nd edition. 2009. https://www.iasa-web.org/tc04/audio-preservation (accessed 30 May 2023).

Kelly, Caleb. *Cracked Media: The Sound of Malfunction.* Cambridge, MA: MIT Press, 2009.

Nunn, John. 'Standards in the AES'. *Journal of the Audio Engineering Society* 46, no. 1/2 (February 1998), 74–76, 78, 80, 82, 84–86.

Springer, Anton M. 'Ein akustischer Zeitregler für Schallaufnahmen'. *Elektrotechnische Zeitschrift* B 8, no. 3 (1956), 93–96.

Wallaszkovits, Nadja. *Audio goes Video: Videographische Metadatensicherung bei Audiobändern der Sammlung Oskar Sala (Vortrag zur Jahrestagung der IASA-Ländergruppe Deutschland/Deutschschweiz e.V., München 2009).* https://www.iasa-online.de/files/2009_Wallaszkovits_Oskar_Sala.pdf (accessed 30 May 2023).

Wallaszkovits, Nadja, Franz Pavuza, and Heinrich Pichler. *Method Comparison of Pick-Up and Pre-Processing of Bias Signal for Wow and Flutter Correction.* Paper presented at the 122nd AES Convention, Vienna, 2007, 7011.

Player Pianos: Music Performances by Humans and Machines

Rebecca Wolf

Abstract

Music by self-playing instruments thrilled a wide audience during the nineteenth and beginning of the twentieth centuries. Comparisons of human playing and the reproducible music of an automaton often led to enthusiastic surprise as soon as the machine mastered dynamics and tempo variations. How does perception shift when a device is inserted between the human player and the musical instrument, as is the case with the Pianola and Phonola pianos? It is no longer the human hand which presses the keys directly. Moreover, the human player operates pedals and levers. The tactile connection to music production has been shifted. This raises questions about who interprets a piece of music, who actually reads and implements the musical code, namely the perforations and markings on the music roll. This paper explores the relationship between the automaton and the human musician. Finally, it opens up perspectives on the issue of authenticity in music and its reproduction in the context of individual interpretation, performance and animation.[1]

Writing in *Modern Music: A Quarterly Review* in 1931, Henry Cowell (1897–1965) had the following to say about player pianos and their implications for contemporary composers: 'Stravinsky and many of his followers have written for player piano rolls music which might be played by hand, but which they desired to divorce from the possibility of misconstruction or "interpretation" by performers. By using rolls the composer makes sure that the tempo, notes and duration of notes are right.'[2] For Cowell, the player piano was a way to eliminate human error from music. It was also an instrument of both conservation and experimentation, bringing the mechanical into the process of composition and thus making possible music that would be too difficult for a human being to play.

The early twentieth century was the era of 'mechanical' music, when debates on the relationship between 'humans and machines' in the musical sphere were fired by such new inventions as the phonograph, gramophone, and radio. Another such mechanical

1 Translation by Kate Sturge. Acknowledgements: This essay was written as part of the research group 'Epistemes of Modern Acoustics' at the Max Planck Institute for the History of Science in Berlin and the research group 'Materiality of Musical Instruments: New Approaches to a Cultural History of Organology', funded by the Leibniz Association (Leibniz Competition) and hosted at the Deutsches Museum, Munich. The author wishes to thank Viktoria Tkaczyk for funding and Peter Pesic, Julin Lee, and Marisa Pamplona for their most welcome readings and suggestions. An earlier paper on a similar topic (Wolf, 'Spielen und bedienen') appeared in German in Saxer, *Spiel (mit) der Maschine*, 137–156.

2 Cowell, 'Music of and for the Records', 63.

instrument was the player piano. Cowell's remarks address only one type of player piano, the 'reproduction instrument' that reproduces a musical interpretation on its own on the basis of a recorded piece. Other types are played by human operators, who apply pedals and hand levers to vary the tempo and dynamics. It is this human interaction with the instrument and with the musical notation of the piano roll that forms the focus of the present article. Just as Cowell suggests that the phonograph record differs from the music of a real instrument,[3] I argue here that player pianos do not merely copy, but create their very own sound, distinct from the recordings upon which their rolls are based. In the 'artistic' instruments, moreover, which are played by an operator to create an original interpretation, the human input creates a hybrid of mechanical and human performance.

With the invention and commercialisation of player pianos – especially the Pianola brand, created by the New York company Aeolian in 1897 (incidentally, Henry Cowell's year of birth) – a diverse system of producing, recording and reproducing piano music began a success story that would last many decades. A range of techniques were developed by many different companies, especially in the United States and Germany. The instruments offered a wide repertoire of musical styles and genres to an even wider audience. If we believe contemporary advertising, the pianola, which was often used synonymous to player piano, was the ideal instrument for people with little or no musical knowledge, bringing the amateur to the focus of attention. It was amateurs, too, who opened a new market for instruments and for new recording media.[4] In view of the interplay of human and mechanical effects in the pianola, however, it is important to attend carefully to actual practices – for anyone who tried to create a satisfying interpretation on the pianola realised immediately that both practice and a degree of musical knowledge were required.

In common classifications of musical instruments, player pianos are counted as self-playing instruments, also called automatophones. The latter term highlights the automatic aspect of the instruments, which were among the first to reproduce a musical interpretation in a way more or less similar to that executed by a human musician at an earlier stage in the process. These instruments bring definitions of 'animated' music and its reproduction to the fore. They are a rich source for research on musical interpretation and on the question of which aspects of music produce a particular individual interpretation at a particular time. Who creates the interpretation – the instrument itself, or the human player, whether as a musician in a recording studio or as the operator of the instrument? What is the role of the human musician or operator in these complex settings? In this paper, I explore the relationship between the perforated musical code on the piano roll and the human musician. This raises questions as to the roles of composers and performers. Finally, it opens up perspectives on the issue of authenticity in music

3 'A record of a violin tone is not exactly the same as the real violin; a new and beautiful tone-quality results. Many variations in tone can be artificially produced.' Cowell, 'Music of and for the Records', 63.

4 See, for example, Katz, 'Amateur'. As well as musical apparatuses such as phonographs and gramophones, Katz also writes on the pianolist's role as a co-performer.

and its reproduction, the relationship of humans and machine in the context of individual interpretation, performance, and animation.

Interpretation: playing and listening in the early twentieth century

In 1911, the Berlin-based satirist Alexander Moszkowski (1851–1934), brother of pianist and composer Moritz Moszkowski (1854–1925), published a book entitled *Das Pianola. Ein Beitrag zur Kunstphilosophie* (The Pianola: A Contribution to the Philosophy of Art). In it, he announced that

> from the very beginning, the pianist is a foreign body in the development of the musical idea. Let us for the sake of argument posit composition, as it presents itself in piano music, as an eternal value. It is complemented by the receptor *[Empfangender]*, the listener, who is to absorb this value into himself, to enjoy its appeal. The ideal relationship would be unmediated contact, the appeal flying across into the receptive organism […] without middlemen or interpreters. […] A Beethoven sonata, a Chopin nocturne ought to sound to the physical ear just as they originally welled up from the inner hearing of their creator. That would be perfection.[5]

> der Pianist von Anbeginn in der Entwicklung der tonkünstlerischen Gedanken einen Fremdkörper bedeutet. Nehmen wir einmal vorläufig die Komposition, so wie sie sich in der Klaviermusik darstellt, als einen ewigen Wert an. Ihr gegenüber steht der Empfangende, der Hörer, der diesen Wert in sich aufnehmen, seinen Reiz genießen soll. Das ideale Verhältnis wäre der unmittelbare Kontakt, das Überfliegen des Reizes in den empfangenden Organismus […] ohne Zwischenhändler und Dolmetscher. […E]ine Beethovensche Sonate, ein Chopinsches Nocturne müßten dem leiblichen Ohre erklingen, wie sie ursprünglich dem inneren Gehör der Erzeuger entquollen. Das wäre die Vollendung.

In terms of early media practices of musical codification, the term 'receptor' is striking here. The listeners are to absorb the music into themselves and take pleasure in it. From this portrait, it is but a small step to the 'receiver', which of course also implies a sender. Moszkowski's language deploys that of early radio. Direct, unmediated transmission is the goal – in this case, from ear to ear, for the musical composition arises in the mind's ear of the composer and ideally should reach the physical ear of the listener with no detours. The passage also makes it clear that even if the work of art is created by the artist, to a substantial degree it takes place only in the process of absorption, of hearing. Ferruccio Busoni (1866–1924) made a similar point around the same time, using related

5 Moszkowski, *Das Pianola*, 7. Here and throughout, all translations are Kate Sturge's unless otherwise attributed.

terminology: 'For the audience does not know and does not wish to know that for a work of art to be received, half the work has to be done by the receiver himself.'[6]

Now, however, the pianist intervenes – Moszkowski calls him the 'agent' trying to connect 'the two poles':

> He has taken a body part that nature designed for gripping and wrested from it the act of piano playing, implanted into it a technique that in every case, even in the best possible case, as the principle of difficulties overcome lays claim to a mechanical validity. This person, therefore, mediates […]. We may be delighted and overwhelmed by the pianist's performance, we may cheer her or him, call her or him back on stage and urge them to supply encores – the more eager we are to applaud, the more obviously we confirm the fact that s/he does not foster that ideal contact but disrupts it.[7]
>
> Einem Organ, das die Natur zum Greifen bestimmte, hat er das Klavierspielen abgetrotzt, eine Technik eingepflanzt, die in jedem, auch im besten Falle als das Prinzip der überwundenen Schwierigkeiten eine mechanische Geltung beansprucht. Dieser Mensch vermittelt also […]. Wir mögen von der pianistischen Darbietung entzückt und überwältigt sein, wir mögen ihm zujubeln, ihn herausrufen und zu Dakapos nötigen, – je beifallsfreudiger wir uns gebärden, desto deutlicher bestätigen wir die Tatsache, daß er jenen Idealkontakt nicht fördert, sondern stört.

As the essay proceeds, Moszkowski even berates the pianist as a parasite who pursues only his own selfish goals. Moszkowski finds the solution to these problems in mechanical musical reproduction. The composition, its spirit, must flow directly into the sensory organs of the listeners: 'The pianistic human being must and will be deactivated; the acrobatic mediator must be replaced by the machine, which – precisely because it is soulless – is qualified to be the most obedient executor of the compositional will.'[8]

That machine is the pianola. Interestingly, Moszkowski does not call the pianola a piece of equipment, apparatus, or instrument that is inextricably connected to the piano, that indeed could not have been invented without the piano, and that we perceive as virtually interchangeable with the piano; he calls it a machine. This way of designating musical automata and self-playing musical instruments is anything but rare.

As early as the start of the nineteenth century, Carl Maria von Weber (1786–1826), for example, wrote of the 'trumpeter, a machine invented by the mechanician Mr. Friedrich Kaufmann from Dresden'.[9] Weber offered detailed descriptions of Kaufmann's

6 Busoni, *Entwurf*, 26. For a partial translation, see Busoni, *Sketch*.
7 Moszkowski, *Das Pianola*, 8–9.
8 Ibid., 9–10.
9 von Weber, 'Trompeter'.

newly invented automata which conventionally utilised the pinned barrel as the musical programme.

The history of automata has its origin in engineering and landscape gardening. The French engineer Salomon de Caus (1576–1626), one of the first to provide a detailed account of the functioning and classes of water organs, initially explained machines in more fundamental terms as load-bearing aids for artisans. He defined machines as constructions that set something in motion by means of air or water. Alongside pumps, mills, and clocks, musical instruments such as violins and whistles form a separate category among them.[10] Caus focused on the machine's moving force and its automatic action, even feigning autonomy.

Historically, the demand to remove human influence from the production of art had frequently been a source of fascination and formed an important context for the perception of self-playing musical instruments. It seems to have flourished anew at the beginning of the twentieth century, when the idea of art executed without human beings found favour not only in music, but also in neighbouring domains such as theatre. In 1908, for example, the British theatrical reformer Edward Gordon Craig (1872–1966) published 'The Actor and the Über-Marionette', which may be read as a manifesto on this theme. Craig almost completely excluded the human actor from the work of art, arguing that human beings, because they are guided by feeling, disturb the ordered course of events. The artwork must be preserved from chaos and coincidence and its systematic implementation is jeopardised by the fact that a human actor is subject to her/his passions, which also usurp the voice, gestures, and facial expressions. Craig's goal is a new form of acting that eschews the imitation of nature and consists 'for the main part in symbolical gesture'[11] indicating that his aim is the abstraction of art through the avoidance of passion.

This is followed by an even more drastic call to eliminate the actor altogether. Having living beings on the stage, writes Craig, only creates confusion:

> The actor must go, and in his place comes the inanimate figure – the Über-marionette we may call him, until he has won for himself a better name. […] There is something more than a flash of genius in the marionette, and there is something in him more than the flashiness of displayed personality. The marionette appears to me to be the last echo of some noble and beautiful art of a past civilization. […] And who knows whether the puppet shall not once again become the faithful medium for the beautiful thoughts of the artist. May we not look forward with hope to that day which shall bring back to us once more the figure, or symbolic creature, made also by the cunning of the artist, so that we can gain once more the 'noble artificiality' which the old writer speaks of?[12]

10 de Caus, *Les raisons*, 'Epistre au bening lecteur'. See also Wolf, 'Musikautomaten', 411. On the concept of the machine more generally, see Schmidt-Biggemann, 'Maschine'.

11 Craig, 'The Actor and the Über-Marionette', 30.

12 Ibid., 39–40.

Here, the actor is roundly denied the function of an artist – allegedly, he demands too much freedom to make his own interpretations. The marionette as an ideal is at once predicated on a traditional, archaic style and imagined as a project for the future, providing a foil for the bodily movements of a rejuvenated art of performance. In a sense, the rejection of the actor as an interpreter and autonomous artist resembles Moszkowski's rejection of the pianist, and both testify to upheavals in the arts around the beginning of the twentieth century. The mission, definition, and delimitation of the artist and his work were all undergoing a sea change.

Moszkowski's ire is not restricted to the living pianist, but encompasses his musical instrument as well:

> For always, between the creation and the hearer, there remains the piano itself, an instrument that – with its levers, felted hammers, metal strings and enormous resonance box – seems to comprise nothing other than a soulless catalogue of tones ordered arithmetically. In itself, the pianoforte appears to us as a mine, filled up with soil and dross and threaded with veins of silver that first have to be separated out, smelted, and wrought into the form of art.[13]

> Denn immer bliebe noch zwischen der Schöpfung und dem Hörer das Klavier selbst, ein Instrument, das mit seinen Hebeln, befilzten Hämmern, metallenen Fäden und seinem riesigen Resonanzkasten zunächst nichts anderes darstellt als einen seelenlosen, nach arithmetischer Ordnung aufgestellten Katalog der Töne. An und für sich erscheint uns das Pianoforte wie ein Bergwerk, angefüllt mit Erde, Schlacke und eingesprengten Silberadern, die erst losgelöst, geschmolzen und zur Kunstgestalt geformt werden müssen.

He also complains that the regular piano demands a 'service' to be supplied by the pianist or pianola, either by wo/man or machine:

> Yes, I will go further still: measured by the sum of its achievements, even today I rate the pianola more highly than I rate any pianist. […] This sum contains the following: the instrument's absolute technical perfection, its absence of caprice, its constant readiness to play, its endless memory, and its inexhaustible repertoire, spanning the whole of the musical canon.[14]

> Ja, ich gehe noch weiter: Nach der Summe seiner Leistungen gemessen stelle ich das Pianola schon heute über irgendeinen Pianisten. […] In dieser Summe sind inbegriffen: die absolute technische Vollendung, die Launenlosigkeit des Instruments, seine stete Spielbereitschaft, sein unendliches Gedächtnis und sein unerschöpfliches, die gesamte Literatur umspannendes Repertoire.

13 Moszkowski, *Das Pianola,* 13.
14 Ibid., 14–15.

Though clearly satirical in intent, the essence of Moszkowski's critique of the human interpreter and musician reveals something that can also be detected in much other contemporary literature on self-playing instruments in general and self-playing pianos in particular: the discrepancy between the work as it is composed and the work as it is performed. Thus, he raises the question of whether the human player or the machine can better present and convey a composition.

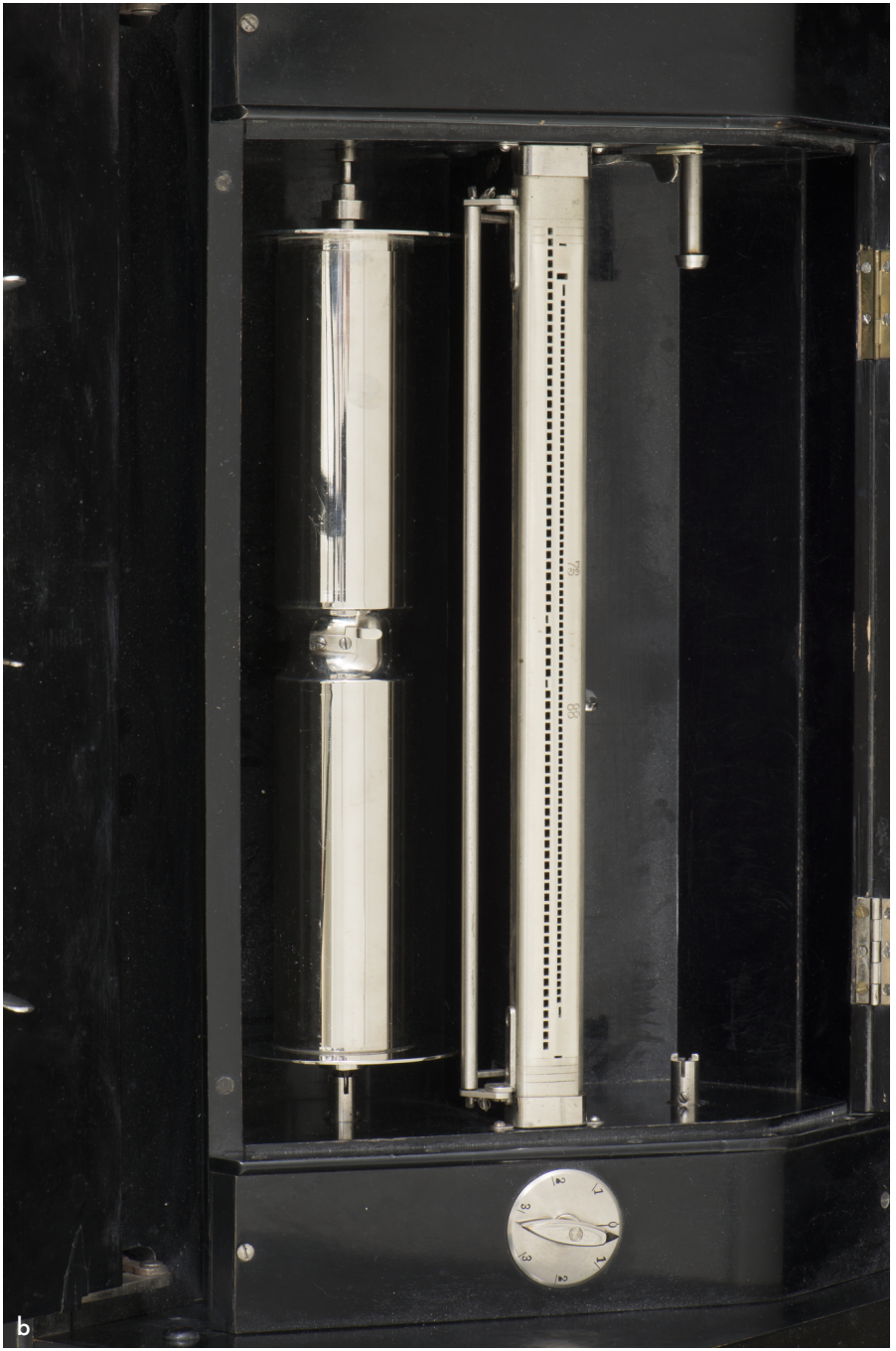
In fact, however, the pianola is unthinkable without a human contribution. Invented in 1895/96 by Edwin S. Votey (1856–1931) and first patented in 1900,[15] it soon shot to prominence. The 'Pianola' produced from 1897 by the Aeolian Company, New York, prompted numerous rivals, such as the 'Phonola' manufactured by Ludwig Hupfeld AG in Leipzig. The brand name 'Pianola' quickly gained currency as a generic term for instruments of this kind. Both 'artistic' pianos such as the Pianola and the Phonola, along with the 'reproducing' pianos that also became widespread shortly afterwards (the German instruments manufactured by Welte in Freiburg were probably the most famous of these), can be classified as self-playing pianos using a pneumatic mechanism.[16] However, the reproducing piano performs a musical interpretation (including dynamics and pedalling) without human intervention, whereas the pianola requires a human player. Indeed, the changed posture and tasks of the person at the instrument as compared to a traditional piano is essential to the pianola's full potentialities. The self-playing apparatus is either integrated directly into the instrument or housed in a cabinet that can be pushed up to the front of a conventional piano. The pianola is usually operated with pedals, which can also be used for accentuation. The player's hands are no longer occupied with playing the piano keys but with operating tempo levers, regulating the dynamics of treble and bass, and activating the operating pedals for the sustain pedal respectively. In other words, the piano's mechanism is extended, there is an apparatus between the musician and the sound-producing components. A 'machine' operates the piano mechanism, as Moszkowski explicitly calls it. It is the playing of the keys, the reaching and moving of the fingers, that the player piano replaces. In the case of push-up players, this is clearly visible.

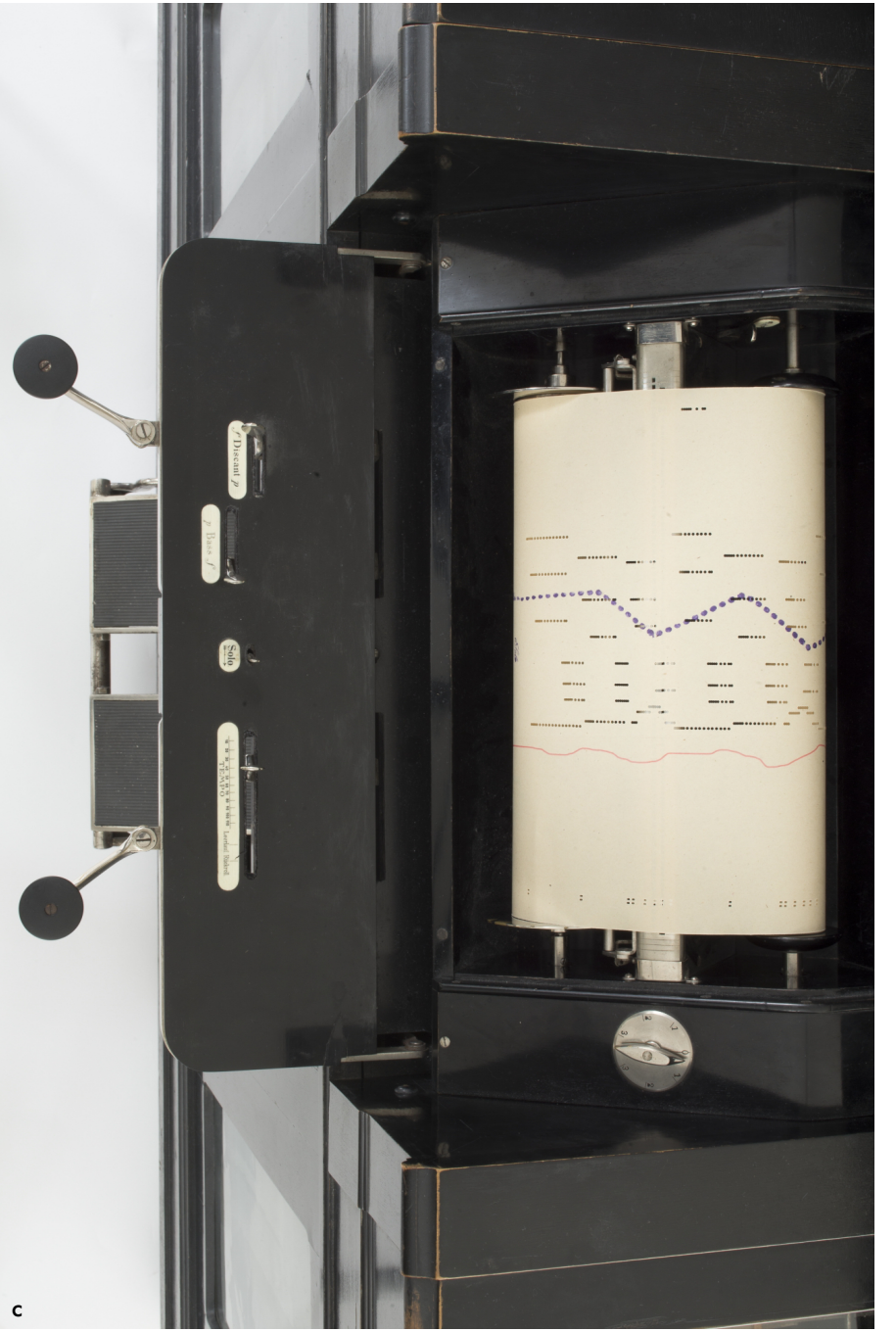
Figures 1 show a typical Phonola push-up player manufactured by Hupfeld in Leipzig. It is operated by foot treadles which activate bellows that create a vacuum and turn the piano roll. As the roll moves over the tracker bar, the bar extracts the musical code pneumatically. The roll carries the musical program, a perforated roll of paper that, in the case of artistic player pianos, is also printed with instructions for playing, indicating features such as tempo, pedalling, and dynamics. These are known as performance marks. The perforations control the activation of the various keys and the duration of the notes; in some cases, the roll also has a Solodant perforation, which emphasises the melodic notes, or a Metrostyle line, which can be followed with a hand lever to vary the tempo at

15 Ord-Hume, *Pianola*, 26.

16 A recent study of reproducing player pianos and their significance for performance research on late nineteenth- and early twentieth-century piano playing is Peres Da Costa, *Off the Record*.

Fig. 1a–d Push-up player (in front of a regular piano), Phonola, Hupfeld, c. 1905, Deutsches Museum Munich # 31069.


b



c

d

which the piece is played. As the codes run past the player's eyes, he or she must track them and carry out further interventions, following either the performance marks or his or her individual judgement. Whereas companies like Welte of Freiburg recorded concert pianists in special salons and created 'reproducing' rolls that supplied an interpretation without the need for further decisions, artistic player pianos offered the user a direct opportunity for human interaction with the 'machine'.

From 1905 on, Hupfeld manufactured artistic piano rolls of this kind, based on particular artists' performances but requiring additional interpretation by the operator. Pianists were invited to the recording salon to play the pieces. It is not known precisely how the recordings took place, but Hans-W. Schmitz quotes a Hupfeld company brochure from around 1907:

> Just as in a concert hall, the artist plays on a grand piano connected to a recording apparatus. Every note, every nuance, the very subtlest variation in tempo is faithfully noted by this highly sensitive apparatus, and this is how the original is created on the basis of which reproductions are produced with mathematical precision using modern mechanical facilities.[17]
>
> Der Künstler spielt, wie im Konzert, an einem Flügel, der jedoch mit einem Aufnahmeapparat verbunden ist. Jeder Ton, jede Nuance, jede noch so feine Temposchwankung wird von diesem fein empfindlichen Apparat getreu notiert und so das Original geschaffen, wonach Reproduktionen in mathematischer Genauigkeit mittels moderner maschineller Einrichtungen hergestellt werden.

The system cannot capture the pianist's use of the pedal; according to Hupfeld, the only features of originality transferred to the piano roll are accentuation and tempo. These seem quite enough to signal equivalence to the original performance. The catalogue goes on to reveal:

> Due to the content of the artist's rolls, the player only needs to follow the exact marks of the artist with respect to touch and pedalling in order to play the piano not only artistically, but with the individuality of a first-rate maestro.[18]
>
> Angesichts des Inhalts der Künstlerrollen verbleibt dem Spieler nur die Befolgung der genauen Vorzeichnungen des Künstlers in Bezug auf Anschlag und Pedalisierung, um nicht nur künstlerisch, sondern in der Individualität eines ersten Meisters Klavier zu spielen.

17 'Phonola, Phonolapiano und Künstlernotenrollen', Ludwig Hupfeld AG Leipzig (sales brochure, c. 1907), quoted in Schmitz, 'Zur Notenrollenproduktion', 29.
18 Ibid., 30.

The task of Phonola players is thus to obey performance instructions that will result in the reproduction of an artistic interpretation played and recorded in advance. Their eyes track the moving perforation and notation, their hands and feet respond to the signs. Only by operating the equipment precisely in line with the instructions can the music and its interpretation be authentically (re-)produced. In the manufacturer's view, this is not the interpretation of the Phonola user her- or himself, but that of a professional pianist. How accurately the original interpretation is actually rendered, however, remains an open question. Rather, the role of the Phonola and Pianola players appears to be considerably more active, in terms of physical effort as well as artistic interpretation.

As well as the novel form of perceiving and implementing the score, the bodily activity of the players is also different from conventional piano playing; in particular, the function of the hand changes. This appears to have been a striking facet of several early sound media. For example, Friedrich Kittler refers to the 'diligent hand of the phonograph user'.[19] In the context of the program as memory, Kittler finds the phonograph superior to all other contemporary storage media (including the self-playing piano) because the phonograph can both write and read[20] – it is a recording device and a playing device at once. Kittler's interest is in the automation of memory that results from offloading a task, traditionally performed by a human, to a machine. Through this mechanisation, memory, according to Kittler, becomes unconscious. While the consciousness of a technical apparatus is a moot point, as far as the influence of the human hand is concerned the turning of the phonograph handle is not simply a mindless operation, but something that animates. According to Kittler, it can lend music additional brilliance. This raises the question of the operating hand's own contribution to interpretation, a question that is equally important for the artistic player piano. What contribution does the human hand make to the artistic process for the pianola player and operator? Is it sufficient – as the advertising implies – merely to obey the rules, in other words the markings on the roll, in order to achieve a convincing musical result, or does the real fascination emanate from our own, ever-unique interpretations?

'Almost anyone can play a pianola'

The manufacturers of artistic player pianos, led by the US company Aeolian and the German Hupfeld AG, stressed in their publicity that anyone could now play the piano – and not just simple pieces: even works usually reserved for professional musicians were now universally accessible. There was much talk of reproductions that were faithful to the original even without any particular knowledge of the notes. Advertisements and

19 'Neither gramophone needles nor brain neurons need any self-consciousness to retrace a groove faster than it was engraved. In both cases it boils down to programming. For that reason alone the diligent hand of the phonograph user, who in Edison's time had difficulties sticking to the correct time while turning the handle, could be replaced by clockworks and electronic motors with adjustable speed.' Kittler, *Gramophone,* 34.

20 Ibid., 33.

slogans for push-up and artistic player pianos were richly varied, and today they still testify to the new market that was emerging. High-calibre musicianship for everyone, especially for amateurs, without prior knowledge or time-consuming practice, was invoked to great marketing effect.[21] A democratic instrument was coming into fashion, one might conclude.

An intriguing example of an amateur who devoted considerable time and practice to playing the pianola was the American photographer Alvin Langdon Coburn (1882–1966). In 1920, he discussed his experience of pianola playing and its complexities in an article with the telling title 'The Pianola as a Means of Personal Expression'.[22] In this piece, Coburn contradicts the pianola companies' promise that the user will reproduce the original interpretation as he plays. Unlike Henry Cowell, cited at the beginning of this paper, Coburn was closely associated with the milieu of British and American artistic player pianos and was himself an enthusiastic pianolist. He gave concerts in London – his 1916 concert at the Aeolian Hall featured pieces for the pianola by Joseph Holbrooke (1878–1958) and Igor Stravinsky (1882–1971).[23] Coburn also took an interest in the technical aspects of the instrument, even cutting rolls himself. He created his own extensive collection of rolls in this way, including the music of his contemporaries. This practice involved a very particular appropriation of musical works, one that was rooted in artisanal activity and knowledge and connected them with artistic production. Coburn opens his essay with the statement, or rather qualification: 'Almost anyone can play a pianola, but to play one well means practice.' His comment highlights the lengthy studies and exercises that, in his view, distinguish the successful amateur. He claims to have practised two hours a day for a year in order to master the instrument. While this may seem to rival the effort required to learn regular piano playing, Coburn stresses the distinction: 'this of course compares very favourably with the more laborious method of playing "by hand".'[24] He points out the further advantages of pianola practice: the player's childhood need not be blighted by years of 'drudgery'; there are no endless finger exercises, no dependence on a teacher. Instead, for Coburn, pianola playing is a means of taking pleasure in artistic expression, in the 'welling-up of an inner joy'.[25] It is this pleasure in expressiveness that he regards as the meaning of music-making and of art in general, and pianola playing offers it a channel to flow into artistic activity. Particularly helpful in this respect is the technical circumstance that the melody is produced by the instrument itself. But ultimately, Coburn locates the great advantage of the pianola in the separation of playing technique from intellectual understanding and personal expression. For many people, the instrument provides the only chance to play complex compositions and arrangements of orchestral pieces. This, in turn, gives composers the opportunity to hear their works actually being performed.

21 For more detail on this aspect, see Ballstaedt, 'Selbstspielklavier'.
22 Coburn, 'Pianola'.
23 Ibid., 45. Unfortunately, Coburn's collection of rolls has not survived.
24 Ibid., 46.
25 Ibid.

Coburn insists on a strict distinction between the pianola and the gramophone. Contradicting the frequent assumption that the two reproductive media fulfil the same purpose, he names personal expression as the dividing line between them: 'A gramophone disc is a fixed and invariable record of an individual performance […] it is not, like the pianola, a means of personal expression. The pianola roll is like a sheet of printed music, in that it has the notes, and you make of them what you will according to your knowledge and temperament.'[26] Just as pianists study the notes of a composition, so pianolists study the pianola roll. What's more, they can even make their own rolls. Using a simple machine not unlike a typewriter, says Coburn, they can punch the perforations themselves. The amateur becomes an enthusiast, and through the study of notes enters the realm of the musical structure.

Coburn also discusses the artist rolls in which some parameters of a pianist's performance are set out through marks and additional perforations; he calls these 'hybrid' rolls. Coburn denigrates such rolls: it is precisely the freedom to supplement the perforations individually that enables the pianolist to make the interpretation his own. In contrast to the gramophone and its 'rather absurd' competitor (the hybrid roll), the 'normal' pianola roll does not force the user to repeat the same predefined interpretation again and again, since 'if you have any musical mind of your own, you do not want to be thus forever fettered to the one rendering of a particular piece. With the normal roll it may be varied with the mood, and is never, of course, twice alike.'[27] This variety on the basis of repeatability is the special virtue of the medium and is what, for Coburn, enables personality to be brought into music.

Selling the repertoire

Piano roll production in the early twentieth century is remarkable for its sheer scope and scale. Piano rolls for reproducing and artistic player pianos covered the classical piano repertoire, encompassing arrangements of operas, operettas, ballets, oratorios, and requiems; salon music, Lieder, and folksongs; chorales, military and dance music.[28] Specialised rolls were also available, such as 'accompaniment rolls'. These allowed the player to accompany another musical instrument, such as the violin or a voice; in the latter case, many had the song lyrics printed parallel to the punches, so that they could be read and sung syllable by syllable (Fig. 2). This repertoire constituted an enormous enrichment of domestic music-making and, judging by the advertising images, promised to gather a cosy and sociable circle around the new instrument. These illustrations suggest that music-making in intimate settings was the prime area targeted.

26 Coburn, 'Pianola' 46–47.

27 Ibid., 47–48.

28 Several recent projects have addressed this issue for selected collections. One is the project exploring the collection of the Deutsches Museum, funded by the German Research Foundation (DFG): https://digital.deutsches-museum.de/projekte/notenrollen/ (accessed 21 December 2022).

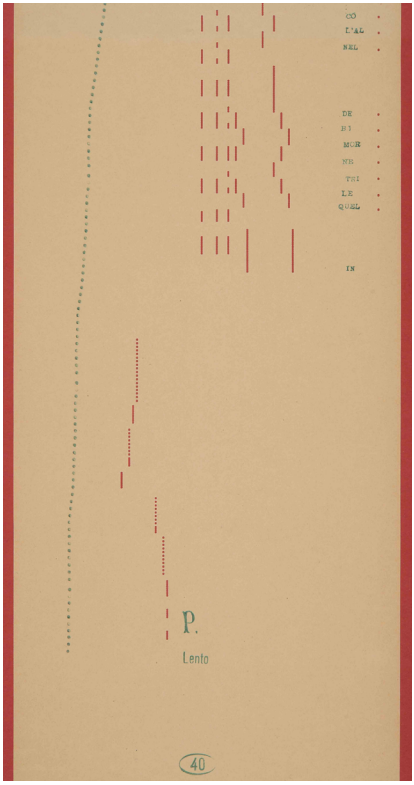


Fig. 2 Piano roll with song lyrics: Fabbrica Italiana Rulli Sonori Traforati, 88 F.I.R.S.T. Vocalist No. 751. Giacomo Puccini: from Manon Lescaut, Act II. Manon's solo, 'In quelle trine morbide'.

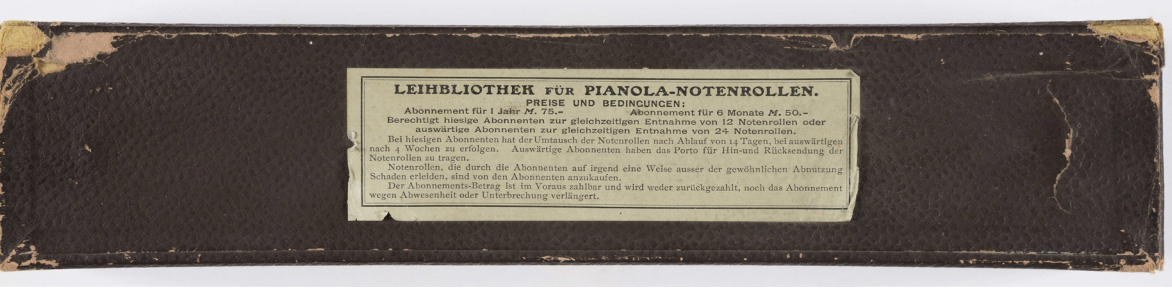


Fig. 3 Subscription form.

The repertoire of rolls sold by Hupfeld, for example, was already enormous in 1905. According to Schmitz, that year the company was offering 3,000 different titles. At this time, the pieces were still transferred, or 'drawn', by hand from a regular musical score onto the roll. By 1912 the number of Hupfeld titles was around 4,000, including adaptations from the early systems onto newer ones, as well as pieces recorded by more than 140 artists, which were described as 'artist rolls'. In 1921, the total list had grown to well over 8,000 different titles.[29]

Piano rolls could be acquired not just by purchase, but also through a subscription system. New pieces were constantly arriving in the borrowing pool, so that subscribers could enjoy the full range of the repertoire and keep completely up to date; both the compositions themselves and the recordings were often recent. Figure 3 shows an example of the information to be found on the boxes of piano rolls destined for subscribers:

> Circulating library for pianola rolls. Prices and conditions: Subscription for 1 year 75 marks, subscription for 6 months 50 marks, entitles subscribers resident in Germany to borrow 12 piano rolls at once, or subscribers abroad to borrow 24 piano rolls at once. Subscribers in Germany must return the rolls within 14 days, others within 4 weeks. Subscribers outside Germany must cover the postage for receiving and returning the piano rolls.
>
> Leihbibliothek für Pianola-Notenrollen. Preise und Bedingungen: Abonnement für 1 Jahr M. 75,- Abonnement für 6 Monate M. 50,- Berechtigt hiesige Abonnenten zur gleichzeitigen Entnahme von 12 Notenrollen oder auswärtige Abonnenten zur gleichzeitigen Entnahme von 24 Notenrollen. Bei hiesigen Abonnenten hat der Umtausch der Notenrollen nach Ablauf von 14 Tagen, bei auswärtigen nach 4 Wochen zu erfolgen. Auswärtige Abonnenten haben das Porto für Hin- und Rücksendung der Notenrollen zu tragen.

This implies a rapid growth in the range of distribution, even crossing national boundaries. Companies' advertising stressed access to the very latest music and an internationalism that this new, mass-produced medium could bring right into the user's own home.

In the case of rolls for artistic player pianos, two aspects are of special significance: the type of notation, and the reproduction of music that was frequently based on an original performance. In the preface to its sales catalogue of 1912, the Hupfeld company addresses both these issues. The separation between hand-drawn rolls, transferring notes from a score, and artist rolls, which registered an actual performance, is explained: 'Whereas the hand-drawn rolls are a transfer of printed notes, in the artist rolls a lively performance with all the idiosyncrasies of human touch takes on a tangible form.'[30]

29 Schmitz, 'Zur Notenrollenproduktion', 27–28.
30 Ludwig-Hupfeld-AG, *Hupfeld Phonola Generalkatalog*, 3.

There were two ways of playing the artist rolls by activating the levers – one strictly following the instructions and thus remaining very close to the recorded interpretation, the other allowing players to make their own interpretation:

> The artist rolls offer the Phonola player a double pleasure, since he may rigorously apply the interpretation of the artist or apply his own interpretation. The variation is achieved by changing the tempo and nuance, yet an artistic performance is always guaranteed because the roll lays down the rhythm, in other words the movement of the beat, that lends a composition its character. As necessary, the Phonola artist rolls are provided with small Solodant perforations for the automatic emphasis of the melody line.[31]
>
> Die Künstlerrollen bieten dem Phonolaspieler einen zweifachen Genuß, streng in der Auffassung des Künstlers oder in seiner eigenen Auffassung zu spielen. Die Abweichung geschieht durch Veränderung der Temponahme und der Nuancierung, doch ist hierbei ein künstlerischer Vortrag stets gewährleistet, da der Rhythmus, d. h. die taktmäßige Bewegung, welche einer Komposition den Charakter verleiht, festgelegt ist. Soweit es erforderlich, werden die Phonola-Künstlerrollen mit den kleinen Solodantlöchern zur selbsttätigen Hervorhebung der Melodie versehen.

The fascination of authenticity

In the first two decades of the twentieth century, much was said about 'true-to-nature' reproduction in the context of piano rolls. However, it should be borne in mind that Hupfeld and other manufacturers also re-punched earlier items for their new systems, and in those early recordings the key pressure had not been recorded. Only parts of the original interpretation were stored in the new notation and were therefore reproducible – but these aspects alone are often credited with fully capturing the artists' performance. The concert pianists themselves frequently also certified in writing that they recognised their interpretations in the 'recordings'. Statements of this kind, often handwritten or signed by hand, can be found on the rolls themselves and in the catalogues. On the roll pictured in Figure 4, which also features a portrait of the pianist, we read: 'This roll contains my personal performance. The musical result of the Phonola with the artist rolls is splendid.'

The roll illustrated is an Animatic, a type produced from 1912 on. Other pictures of this particular roll show the complete item and various details. At the beginning of the perforation, we see the Solodant system for emphasising the melody notes and a dynamics line that can be followed using a hand lever. Rolls like these also offer perforations to activate the sustain pedal. By signing the recording, the pianist confirms that the roll contains his very own performance, his own interpretation. (Fig. 4)

31 Ludwig-Hupfeld-AG, *Hupfeld Phonola Generalkatalog*, 3.

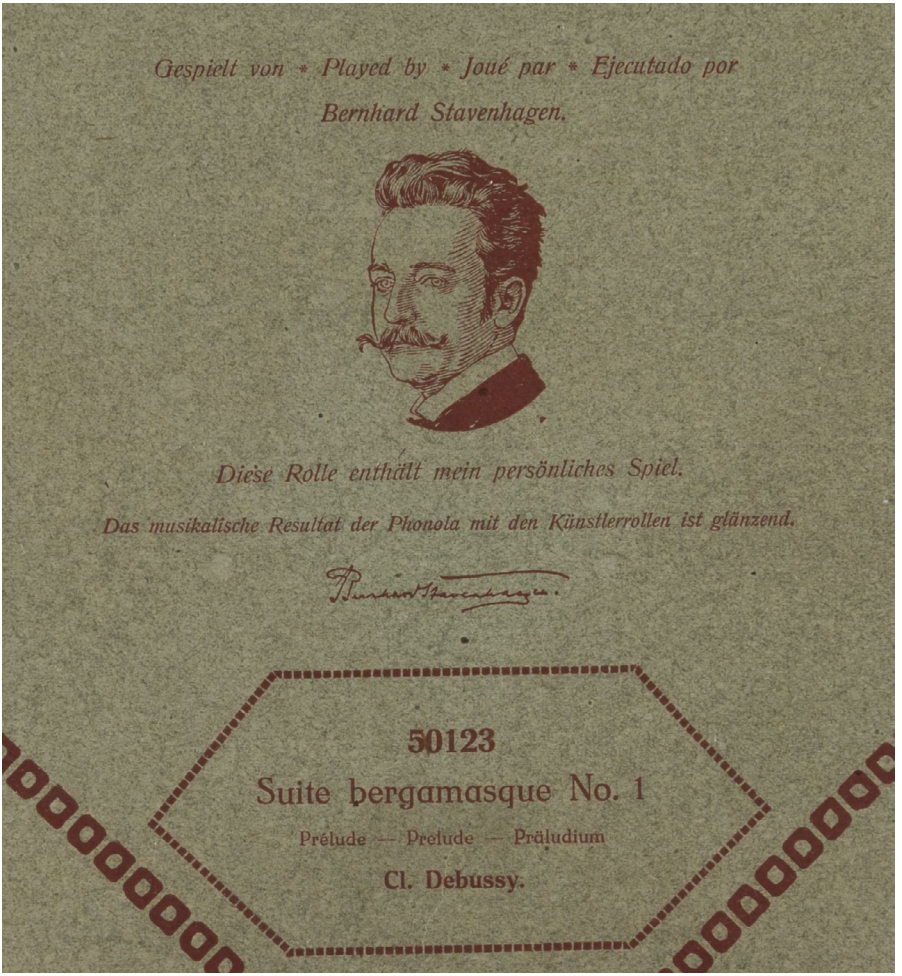


Fig. 4 Deutsches Museum #1988-481T007. Hupfeld Animatic no. 50123: Bernhard Stavenhagen plays Claude Debussy: Suite bergamasque No. 1, Prélude.

But how much of that original playing is really transported by the roll's encoding? If we play an artist roll, will we hear the authentic playing of concert pianists from a hundred years ago? How can the concept of authenticity be applied to the piano rolls?

The notion of authenticity evokes the original in contradistinction to a copy,[32] and frequently also something genuine and unique – which in the piano roll trade, however,

32 On authenticity see, for example, Knaller and Müller, 'authentisch/Authentizität'; Saupe, *'Authentizität' Version: 3.0.*

is copied in large numbers. In this case, the original would be the master roll that was created as the basis for reproduction. But is the original not, rather, the unique performance, the ephemeral moment of playing into the recording machine? Or does the piano roll itself, as an object and musical program, acquire the status of authenticity? In order to describe something as authentic, an authority is required – a witness. The pianist's seal of approval appears to fulfil this authenticating role: the recording has been inspected and elevated to a special status, and the transformation of the actual original into a storage medium has been successfully concluded.

The Hupfeld catalogue of 1912 also prints several endorsements by pianists. Like those on the rolls themselves, they are combined with the pianist's portrait and a facsimile signature. Bernhard Stavenhagen (1862–1914), whose praise for the player piano was printed on the roll in Figure 4, is among those quoted:

> I came across your Solodant Phonola with the artist rolls and have to say that the musical result is splendid. – It is remarkable to see the ease with which this pneumatic and highly sensitive instrument can be handled, the amount of expressivity that dwells within it![33]
>
> Ich lernte Ihre Solodant-Phonola mit den Künstlerrollen kennen und muß das musikalische Resultat als glänzend bezeichnen. – Es ist erstaunlich, mit welcher Leichtigkeit dieses pneumatische, so überaus empfindliche Instrument gehandhabt werden kann, welche Summe von Ausdrucksfähigkeit ihm inne wohnt!

A further example of certifying authenticity is a piano roll with a handwritten validation by the musician (Fig. 5). Here, the artist attests his recording in his own hand and mentions the 'stored' aspects of tempo and idea. Such endorsements were an important advertising technique, but they referred only to certain parameters of the interpretation as having been transferred authentically. Apparently, these sufficed to validate the originality of the playing, even though it might be expected of a reproducing role that it would, precisely, 'reproduce' the original performance.

The theme of fidelity to an original is equally crucial in early gramophone recordings. Here, too, advertisements from the first decade of the twentieth century claim that the music played or sung live is as good as identical to the aural experience of the reproduction. In this context, Jonathan Sterne notes that listeners at home had to acquire a more differentiated perception before they were able to distinguish between music generated by human beings and by machines.[34] At first, certainly, the special aurality of early gramophone records does not appear to have attained any aesthetic autonomy. Modern notions of original and copy fall short here, and when playing the artist rolls a further

33 Ludwig-Hupfeld-AG, *Hupfeld Phonola Generalkatalog,* 130.
34 See Sterne, *The Audible Past,* 215–16.

Fig. 5 65 Pianola Themodist, S.K.H. Prinz Ludwig Ferdinand von Bayern: Die wilde Jagd, Fantasiestück, Op. 6. Written at the beginning of the role, apparently in ink: 'The Metrostyle line gives the exact tempo and idea of the composition, Ludwig Ferdinand.' Sticker on the box: 'Interpretation Indicated by S.K.H. Prinz [H.R.H. Prince] Ludwig Ferdinand von Bayern.'

dimension is added: it is the person playing or operating the instrument who produces the interpretation. Only the human–machine interaction generates living music and reveals the artistic player piano to be a musical instrument as opposed to a mere playback device.

By playing the rolls on surviving instruments today, it quickly becomes clear that many parameters depend on the specific apparatus at hand. This is true both for artistic and reproducing pianos. We may play different rolls of a single 'recording' on the same instrument, yet obtain different aural results. Although the rolls are based on the same performance, some of them were later reworked for newer systems; something like new

editions arose. Furthermore, the instruments are tricky to adjust and the perforated paper changes over time, depending on temperature and atmospheric humidity.[35] Nevertheless, these program carriers seem to convey enough of the original playing for the claim to be made that we can hear the original. Possibly, such judgements arise from a focus on particular aspects of the performance such as tempo, ornamentation, and arpeggiation. One thing is clear: piano rolls remain important sources for performance research today.

Notation

In the manufacture of artistic piano rolls, the musical code was often transferred from a standard score, producing a new, perforated score that at first glance would seem illegible to the human eye; the instrument's mechanism is what reads it. The negative air pressure produced by the pedals flows through the perforations as they pass across the tracker bar, so that when air moves through a perforation, the mechanism activates the relevant piano key. There are also perforations that regulate the pitch and duration of the notes, as well as such other elements of interpretation as accentuation. In most cases, the rolls for artistic player pianos include further instructions: they prescribe the tempo, and the player can use levers to activate the sustaining pedal and follow a dynamic line. This requires him or her to move physically. The pedals have to be operated regularly and vigorously throughout, the hands take on the function of the pedals on a conventional piano, and the eyes must carefully follow the notation in order to translate the dynamic line into movements of the levers and relate it to the perforation. Obviously, the ears are involved, too, as a regulating element. Experience shows that first attempts to use the instrument are rarely satisfactory. Players need coordination, practice, quick reactions, and above all a sound grasp of music – they have to listen and read their way into the piece. After a while, a recognition effect emerges and the notation becomes more and more legible. Alexander Moszkowski commented:

> Performance? Master musician? – Yes, certainly. Playing and players may earn this title this very day. The handling of the Metrostyle lever, the registration, and especially the art of pedalling, the economisation of the air flow opens up a whole gamut from the beginner's clumsiness to complete mastery, along with the corresponding scale from the dry reproduction of notes up to the highly musical recital. The only distinction from the original piano is that the hand pianist must sacrifice half his life to acquiring his technique, whereas the pianolist, freed from this drudgery, is the higher-order player and can immediately begin to train himself upwards on the purely spiritual, on the performance.[36]

35 Two recent master's theses have also examined these aspects: Kerber, 'Perforierte Notenrollenpapiere' and Kordt-Dauner, 'Frühe Speicher'.

36 Moszkowski, *Das Pianola*, 22–23.

> Vortrag? Meister? – ja, ganz gewiß. Schon heute können Spiel und Spieler diese Titel verdienen. In der Handhabung des Metrostylhebels, in der Registrierung, vom allem aber in der Kunst der Pedalgebung, in der Ökonomisierung des Luftstromes öffnet sich die ganze Stufenleiter von der Unbeholfenheit des Anfängers bis zur Meisterschaft; und demzufolge eine entsprechende Skala von der trockenen Wiedergabe der Noten bis zum hochmusikalischen Vortrag. Nur mit dem Unterschied vom Urklavier, daß der Fingerpianist sein halbes Leben der Erlangung der Technik opfern muß, während der Pianolaspieler, entbunden von dieser Fron, als der Spieler höherer Ordnung sich sofort am Reingeistigen, am Vortrag, emporbildet.

Moszkowski stresses the changing function of the hands. Different domains are distinguished, and the dividing line is the operation of the machine – this gives the notation a different function. The perforated notation is still a memory and a storage medium, but more for the machine than for the artist, who, according to contemporary accounts, may surrender her- or himself completely to the music.

In many ways, this recalls the case of early notation machines. In the mid-eighteenth century, blueprints of music-writing devices for keyboard instruments were drawn up, initially in London and Berlin.[37] At first, the aim was to capture in writing the duration of notes and their pitch during piano playing. Devices were invented that could be added to keyboard instruments: the mechanism for depressing the notes was connected to a writing device that left marks on a paper ribbon as it rolled past.

An instrument of this kind, built in 1780, has been held by the Deutsches Museum since 1915 (Fig. 6 and 7). It was manufactured by John Joseph Merlin (1735–1803) in London, where he worked as a 'mathematical instrument maker' and presented numerous inventions in his Mechanical Museum.[38] In an instrument combining a fortepiano and a harpsichord, the notation machine is inserted as a removable trough, activated by hand levers. A clockwork mechanism sets the paper ribbon in motion. When the instrument is played, small moveable pencils set as a row in the back edge are pressed onto the moving paper and register the notes. There is one pencil for each key. The machine produces a new notation, but this still had to be deciphered, so Merlin invented a cardboard ruler that could be placed on the paper roll after recording. His plan was to translate the marks into standard notation. The ruler enabled each of the chromatic tones of the keys to be identified, so that every horizontal line on the paper could be followed and transferred.

Just as in the piano rolls, here the notation is read horizontally – in the player piano from the tracker bar, in this early notation device from the ruler. The coding is not particularly sophisticated: pitch and duration can be gleaned from it, but the metrical beats have to be laboriously reconstructed.

37 Freke, 'A Letter'; Unger, *Entwurf*.

38 For a more detailed account of this instrument, see Wolf, *Friedrich Kaufmanns Trompeterautomat*, 206–18. The instrument, which still survives, was restored and partially reconstructed in the early twentieth century.

Fig. 6 Combined harpsichord and fortepiano with writing device, J. Merlin, Deutsches Museum #43872.

Fig. 7 Detail of the reconstructed writing device, harpsichord, J. Merlin.

Peter Schleuning has associated devices of this kind with the emergence of the free fantasia around Carl Philipp Emanuel Bach (1714–1788). Free improvisation was to take its course undisturbed, but nevertheless be repeatable. To this end, the functions of the hand were divided up differently. In existing processes of composition, the hand had first played the instrument, then was lifted to write the notation, so that there was constant interruption; the notation machine, in contrast, would leave the process of artistic creativity undisturbed. Only at a later stage would the standard score be written down. Here, the individual tasks of music-making and composition are split up and thereby categorised. The artistic element is separated from the element of mere transfer, of the production of a notation – in many cases, notation is even designated as a copying contrivance.[39]

Moszkowski subdivides the actions of the pianola player in another way. It is no longer the craft of the piano virtuoso that must be learned, for access to the spiritual work of art becomes far more direct and immediate through the pianola – the pianist's arduous technique falls away, opening up the path for complete concentration on the higher level. Moszkowski writes of the piano roll:

> The soul of the pianola is the music roll, for this contains the comprehensive expression of the composition, so that the work of art itself has here become a component of the instrument. The creation of notes does not enter in from outside, but lives one and the same life with the mechanism that performs them.[40]
>
> Die Seele des Pianola ist die Notenrolle; denn diese enthält den erschöpfenden Ausdruck der Komposition, und so ist hier das Kunstwerk selbst zu einem Bestandteil des Instrumentes geworden. Die Tonschöpfung tritt nicht von außen heran, sondern lebt mit dem darstellenden Mechanismus ein und dasselbe Leben.

He also mentions the pneuma or 'breath' of the bellows that read the perforation. For Moszkowski, the life of the composition is located in the instrument itself.

39 Schleuning, 'Die Fantasiermaschine'.
40 Moszkowski, *Das Pianola*, 25.

Like the notation of early devices such as Merlin's, the marks for simultaneous tones in perforated rolls are aligned horizontally. Moszkowski praises this arrangement for its clarity: it is easier to follow, obviating the need to learn the complex codes of traditional notation. One might add that it also favours the players' ability to analyse the piece. With a little practice, the notation can be followed very effectively with the eyes, while experienced pianola players can even sing from sight. As the Phonola advertisement in Figure 7 tells us, the player is offered both possibilities: 'a true-to-nature reproduction of the artist's performance by means of the Phonola, yet at the same time according every freedom to the personal interpretation of the player himself.' Special emphasis is thus placed on the opportunities for independent intervention enjoyed by the player.

Pianola playing as imitation or interpretation

Again and again, playing the Pianola or Phonola is represented not as a professional activity, but something attainable by all. The concert pianists who record the pieces are famous, but the pianolists are not. To what should we attribute this distinction? Does it reveal a trend of the era? Moszkowski appears to reject the performers of music in the most general way – for him, the true work of art is created by the composer, and every intermediary unnecessarily alters the work or even exploits it for selfish ends.

And yet the pianolist probably plays the most important role. As in Figure 8, the players are represented as serious and concentrated, or else as sociable and having fun. They tend to form the focus of the illustrations, and their physical presence is foregrounded. It is they who let the music sound and who give it life through the action of the pedals and levers, regardless of whether they exactly follow the prescribed interpretations or apply their own ideas.

The case of the player piano offers several points of intersection with broader aesthetic frameworks of the period. Busoni, for example, discusses not only the function of the listener as a co-creator of the performance, but also the notation and transcription of music. Notation is an expedient for dissolving the music from the page and setting it in motion,[41] and the performer's inspiration is necessary for this to happen. Busoni cites the composer's own interpretations, which differ in the course of frequent repetitions and may also deviate from the notation. For him, it is the performers who are the creators.

Against the background of aesthetic concepts of mimesis such as those discussed by Gunter Gebauer and Christoph Wulf with respect to play, ritual and gesture, these actors' creativity and formative contribution comes to the fore: 'In mimetic action, an individual generates his own world, but also references a different world that already exists, whether in reality or in the imagination.'[42] Action remains individual even when it follows a model or an ideal. It is always influenced by subjective judgements and reactions. When

41 Busoni, *Entwurf*, 29.
42 Gebauer and Wulf, *Spiel – Ritual – Geste*, 7.

Fig. 8 Hupfeld advertisement. 1907.

following a model, 'we by no means refrain from our own shaping of our world; we act independently, and yet we interlock, like a zipper closing, with a different world.'[43] This may also explain the extraordinary fascination of the artistic player piano, of individual playing on the basis of already extant music. The physical movement and the interaction with the existing interpretation make the pianolist's playing into a performance. His or her own movement refers to other movements, those of the concert pianist whose interpretation was used for the roll. It is an imitation, yet simultaneously an independent action that changes the original – it is a performative act.

43 Gebauer and Wulf, *Spiel – Ritual – Geste*, 9.

Conclusion

The allure of playing an artistic player piano may lie in precisely this productive ambivalence. The desire for both exact imitation and one's own active intervention forges a particularly intimate link with historical interpretations. The actual performance of the pianolist is partly generated by sensing and physically realising the recorded artist's intention with one's own movements, but the pianolist always adds a new contribution: individual music arises in close contact with another artist. Sensing the authentic is the foremost objective, and it generates reflections on what such authenticity may be. Is authenticity to be found in accurately following the marks, or in thinking about and analysing the composition? Both are the results of practised listening, as well as of concentrated looking at the notation and learning how to react to it physically. Pianolists study the composition in a very particular way – with their eyes, ears, hands, and feet. Perhaps the musical education here lies in the intensive engagement with a musical piece and its possible elaboration. Activating the Metrostyle lever regulates the tempo, vitalises the mechanical process, and lends the music its individual features as the playing proceeds.

To play with this reproductive device is to enjoy a great spectrum of new experiences and expressive possibilities. Such playing is relevant for the fields of artistic performance, pedagogy, musical training, technology, listening to one's own art, and knowledge of music. Just as early notation machines, such as Merlin's 1799 device, divided up the various techniques of piano playing into hand techniques and compositional or creative production, so the pianola permitted a division between the pure techniques of the performer's hand and the intellectual art of interpretation. Alvin Landon Coburn made the distinction in terms of personal musical expression and pleasure: 'The pianola offers the nearest method of approach to pure musical enjoyment. The notes are there, it is only the interpretation that need be thought of.'[44]

Making music with the player piano thus opened up new opportunities, though even Coburn concedes that only the very best pianolists managed to exploit them in full. Nevertheless, the instrument widely disseminated the art of artificial piano playing in the early twentieth century and generated novel possibilities for composers as well. For musicologists today, it is an instrument that enables new life to be breathed into long-vanished interpretations – that enables them to be reanimated in the best sense, as individual interpretations. It offers us the chance to interact with historical interpretations, to reflect and study them, and to subject them to our own musical expectations.

44 Coburn, 'Pianola', 49.

Bibliography

Ballstaedt, Andreas. 'Das Selbstspielklavier als Schnittpunkt von Mensch, Musik und Maschine'. In *Maschinen und Mechanismen in der Musik*, ed. by Boje E. H. Schmuhl and Ute Omonsky, 95–108. Augsburg: Wissner, 2006.

Busoni, Ferruccio. *Entwurf einer neuen Ästhetik der Tonkunst* (1907/1916), ed. by Martina Weidel. Leipzig: Insel, 2001.

–. *Sketch of a New Esthetic of Music* (1907), trans. Theodore Baker. New York: G. Schirmer, 1911.

Coburn, Alvan Langdon. 'The Pianola as a Means of Personal Expression'. *The Sackbut* 1, no. 2 (1920), reprinted in *The Pianola Journal* 12 (1999), 45–49.

Cowell, Henry. 'Music of and for the Records'. *Modern Music: A Quarterly Review* 8, no. 3 (1931): 32–34, reprinted with a brief introduction in The Pianola Journal 17 (2006), 62–64.

Craig, Edward Gordon. 'The Actor and the Über-Marionette' (1911). In *On the Art of the Theatre*, edited by Franc Chamberlain, 27–48. London: Routledge, 2009.

De Caus, Salomon. Les raisons des forces mouvantes. *Avec diverses Machines tant utiles que plaisantes: Auxquelles sont adjoints plusieurs desseins de Grotes & Fontaines*. Frankfurt: J. Norton, 1615.

Freke, John. 'A Letter from Mr. John Freke F. R. S. Surgeon to St. Bartholomew's Hospital, to the President of the Royal Society, inclosing a Paper of the late Rev. Mr. Creed, concerning a Machine to write down Extempore Voluntaries, or other Pieces of Music'. *Philosophical Transactions, Giving Some Account of the Present Undertakings, Studies, and Labours, of the Ingenious, in Many Considerable Parts of the World* 44, no. 483 (1747), 445–450.

Gebauer, Gunter and Christoph Wulf. *Spiel – Ritual – Geste: mimetisches Handeln in der sozialen Welt*. Reinbek bei Hamburg: Rowohlt, 1998.

Katz, Mark. 'The Amateur in the Age of Mechanical Music', in *The Oxford Handbook of Sound Studies*, ed. by Trevor Pinch and Karin Bijsterveld, 459–479. New York: Oxford University Press, 2012.

Kerber, Yasmine. 'Perforierte Notenrollenpapiere als Tonsteuerungsträger mechanischer Musikinstrumente. Identifizierung, Materialität und Konservierung'. Master's thesis, Bern University of the Arts, 2015.

Kittler, Friedrich. *Gramophone, Film, Typewriter*, translated by Geoffrey Winthrop-Young and Michael Wutz. Stanford, CA: Stanford University Press, 1999.

Knaller, Susanne and Harro Müller. 'authentisch/Authentizität'. In *Ästhetische Grundbegriffe: Historisches Wörterbuch in sieben Bänden*. Vol. 7, Register und Supplement, ed. by Karlheinz Barck, Martin Fontius, Dieter Schlenstedt, Burkhart Steinwachs, and Friedrich Wolfzettel, 40–65. Stuttgart: J.B. Metzler, 2005.

Kordt-Dauner, Till. 'Frühe Speicher musikalischer Interpretation. Ignaz Paderewskis Welte-Mignon-Einspielungen und ihr Kontext'. Master's thesis, Ludwig Maximilian University Munich, 2014.

Ludwig-Hupfeld-AG. *Hupfeld Phonola Generalkatalog*. Leipzig: Ludwig Hupfeld, 1912.

Moszkowski, Alexander. *Das Pianola. Ein Beitrag zur Kunstphilosophie*. Berlin: Schlesinger, 1911.

Ord-Hume, Arthur W. J. G. *Pianola: The History of the Self-Playing Piano*. London: George Allen & Unwin, 1984.

Peres Da Costa, Neal. *Off the Record: Performing Practices in Romantic Piano Playing*. New York: Oxford University Press, 2012.

Saupe, Achim. *'Authentizität' Version: 3.0*. In *Docupedia-Zeitgeschichte*, 25 August 2015. http://docupedia.de/zg/saupe_authentizitaet_v3_de_2015 (accessed 10 January 2023).

Saxer, Marion, ed. *Spiel (mit) der Maschine. Musikalische Medienpraxis in der Frühzeit von Phonographie, Selbstspielklavier, Film und Radio.* Bielefeld: transcript, 2016.

Schleuning, Peter. 'Die Fantasiermaschine. Ein Beitrag zur Geschichte der Stilwende um 1750'. *Archiv für Musikwissenschaft* 27, no. 3 (1970), 192–213.

Schmidt-Biggemann, Wilhelm. 'Maschine'. In *Historisches Wörterbuch der Philosophie,* vol. 5, ed. by Joachim Ritter and Karlfried Gründer, 790–802. Basel: Schwabe, 1980.

Schmitz, Hans-W. 'Zur Notenrollenproduktion bei der Ludwig Hupfeld A.-G., Leipzig'. In *Namhafte Pianisten im Aufnahmesalon Hupfeld,* ed. by Eszter Fontana, 27–31. Halle/Saale: J. Stekovics, 2001.

Sterne, Jonathan. *The Audible Past: Cultural Origins of Sound Reproduction.* Durham, NC: Duke University Press, 2003.

Unger, Johann Friedrich. *Entwurf einer Maschine wodurch alles was auf dem Clavier gespielet wird, sich von selber in Noten setzt. Im Jahr 1752. an die Königl. Akademie der Wissenschaften zu Berlin eingesandt, nebst dem mit dem Herrn Direktor Euler darüber geführten Briefwechsel, und einigen andern diesen Entwurf betreffenden Nachrichten.* Braunschweig: Fürstl. Waisenhaus-Buchhandlung, 1774.

Von Weber, Carl Maria. 'Trompeter, eine Maschine von der Erfindung des Mechanicus, Hrn. Friedrich Kaufmann, in Dresden'. *Allgemeine musikalische Zeitung* 14, no. 41 (7 October 1812): 663–666.

Wolf, Rebecca. *Friedrich Kaufmanns Trompeterautomat. Ein musikalisches Experiment um 1810.* Stuttgart: Franz Steiner, 2011.

–. 'Musikautomaten'. In *Akustische Grundlagen der Musik,* ed. by Stefan Weinzierl, 409–431. Laaber: Laaber-Verlag, 2014.

–. 'Spielen und bedienen. Das selbstspielende Klavier als virtuose Maschine.' In *Spiel (mit) der Maschine. Musikalische Medienpraxis in der Frühzeit von Phonographie, Selbstspielklavier, Film und Radio.*, ed. by Marion Saxer, 137–156. Bielefeld: transcript, 2016.

Showing Unmaking: On the Technological Reproduction of Nam June Paik's *One for Violin Solo*

Katja Müller-Helle

Abstract

This paper analyses Nam June Paik's performance *One for Violin Solo* (1962) in the context of its illustration, technologisation and actualisation in contemporary YouTube culture. Its thesis is that this time-bound destruction piece cannot be comprehended by the logic of original performance and subsequent documentation because its materiality is originally constituted in reproduction. This circumstance affects what we define as the material of the work and leads to the conclusion that circulating photographs produce a pictorial encoding of the performance. Current discussions in the field of material studies about material activity in artistic processes that focus on the interaction of makers, materials and tools are here expanded to encompass technologisation and the tendency for open-endedness in contemporary digital culture.

1.

In October 2018, eight violins were smashed to pieces in Manila at the opening of one of the largest Nam June Paik (1932–2006) exhibitions ever mounted in South-East Asia. In the same year it had also come to light that social media content moderators based on the outskirts of the Filipino capital had been censoring around 25,000 images every day in a bid to purge the internet of nakedness and violence, even as the protagonists of a major group of art institutions (the León Gallery, Gagosian Asia and the Nam June Paik Estate) were working in the same city, creating new images to raise the visibility of avant-garde culture on the web:[1] the synchronicity of a connected world.

Paik's *One for Violin Solo* was first performed as a solo piece, at the Kammerspiele Düsseldorf in 1962. The curators' choice of this work to present Paik to the Filipino audience at the 2018 opening in Manila throws up a whirlwind of dates and places: Paik was born in Seoul in 1932 but fled South-East Asia during the Korean War in 1950, passing through Hong Kong and Tokyo en route to Munich. In Europe and North America he has been regarded as a pioneer of video and media art ever since the 1960s.[2] But the fact that eight people – among them Barack Obama's ambassador to the

1 See Hans Block and Moritz Riesewieck's documentary film *The Cleaners* (Germany 2018, original title: *Im Schatten der Netzwelt)*. For the new occupation of the content moderator see Gillespie, *Custodians of the Internet,* and Rothöhler, 'Informationen, die Bilder haben'. For image censorship on social media and elsewhere see Müller-Helle, 'Noise Bodies'; Müller-Helle, *Bildzensur.*

2 The reception history of Paik's work in the German-speaking countries was decisively influenced by the publications of Wulf Herzogenrath, e.g. his *Nam June Paik* of 1983, and the appraisal of the Paik collection at MUMOK in Vienna, on which see Neuburger, *Nam June Paik*. For the current Anglo-American discourse see Hölling, *Paik's Virtual Archive.*

Figs. 1–3 Group performance of Nam June Paik, *One for Violin Solo*, October 2018 [1962], León Gallery Manila.

Philippines, the Seoul-born Sung Y. Kim[3] – from institutions with an obvious interest in increasing Paik's market value stood behind a raised steel bar and smashed eight violins to pieces on the evening of the exhibition opening shows that this ephemeral, time-bound work of neo-avant-garde art had already existed as a media image on the web (Figs. 1–3).[4] On 22 October 2018 the León Gallery in Manila tweeted four documentary photographs taken before, during and after the destructive act: the gleeful faces of the performers holding their unharmed instruments aloft, the tension-laden duration of the performance (the original five minutes of Paik's historic performances were shortened to around thirty seconds) and finally the laughter accompanying the act of destruction. The performers were allowed to take parts of their smashed instruments home with them as souvenirs; the photographic documentation of the performance was put into circulation on the internet.[5]

In the sixty-one years that have elapsed since the piece was first performed in 1962, the destructive performance has experienced a semantic shift. The photographs generated by ever new iterations of *One for Violin Solo* have turned the piece into an object between artefact, art market and art historiography, and as such it begs the following question: How has its material basis changed over time? Or in other words: What changes in that which we call the material of *One for Violin Solo* when the various media in which it appears (photographic and filmic documentation, circulating YouTube videos) are taken into account and when it is no longer simply conceived according to the logic of an original performance and its subsequent photographic and filmic representation? This paper advances the thesis that the appearance of Paik's destructive performance is constituted originally, not subsequently, by the media of photography and film, and that this entails a technological encoding of the concept of material.

2.

In recent years the field of material studies has increasingly focused its attention on artefact production as an interaction between makers, tools and materials. With reference to Richard Sennett's book *The Craftsman*, Ann-Sophie Lehmann describes the act of making 'as a temporary creative unit, fixed in time and place, in which materials, tools,

3 As guest of honour, the US ambassador was allowed to smash his violin first; the other seven performers followed suit soon after. The author would like to thank Lisa Guerrero Nakpil, curator at the León Gallery in Manila, and Ken Hakuta, nephew of Nam June Paik and administrator of the Nam June Paik Estate, for detailed information about the performance at the opening and for making photographs and image rights so readily available.

4 The performers that evening were Mr. Ken Hakuta (administrator, Nam June Paik Estate), H.E. Ambassador Sung Kim, United States of America, Mr. Jaime Ponce de Leon (director, León Gallery), Ms. Lina Juntilla (León Gallery International), Mr. Marcel Crespo (Filipino collector), Mr. Nick Simunovic (director, Gagosian Gallery Asia), Ms. Lisa Guerrero Nakpil (cultural consultant, León Gallery) and Mr. Jon Huffman (curator, Nam June Paik Estate).

5 Email correspondence between the author and Lisa Guerrero Nakpil (León Galley Manila), 27 March 2019.

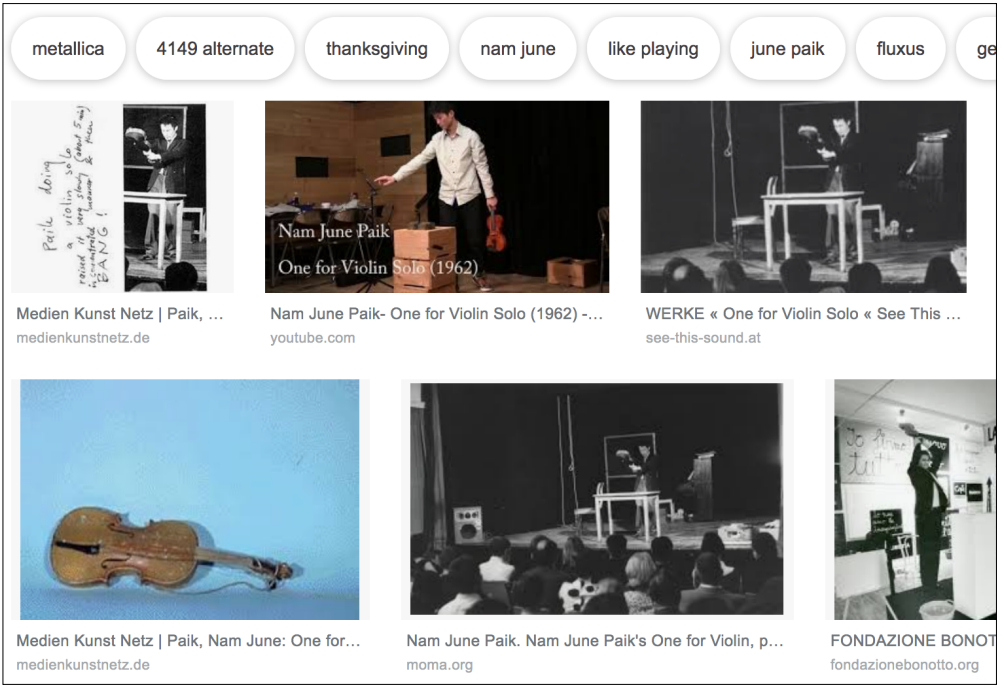
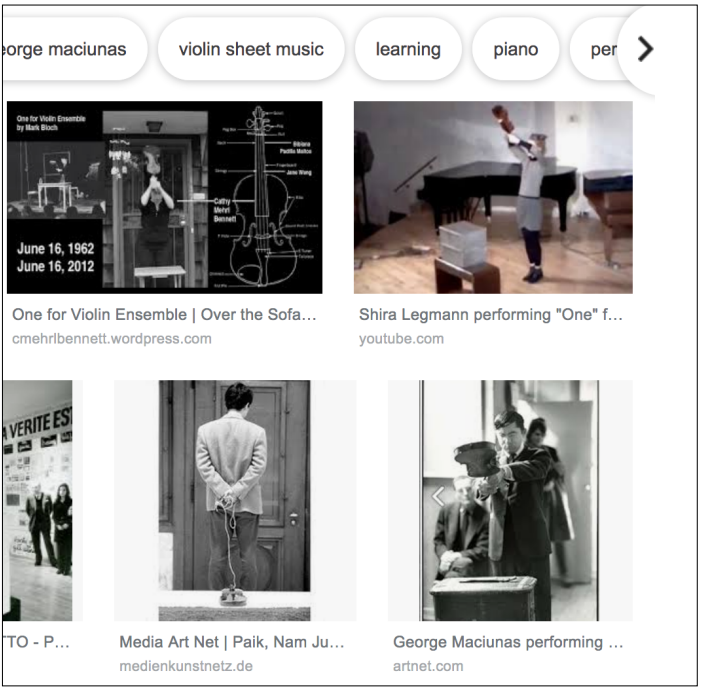


Fig. 4 Screenshot of a Google search for *One for Violin Solo* by Nam June Paik, 1 April 2019.

and makers interact'.[6] This definition of the material activity of the artwork abandons a conception of artefacts based on finished objects and complete mastery of materials by the artist and instead lends weight to the production process. In line with actor-network theory, this approach emphasises the agency of materials and their activity in the production process.[7] This strong focus on how an artwork comes into being makes it easier to understand how processes are influenced by various actors, tools and materials, but ultimately there remains the idea of a definite production time ('fixed in time and place') by the end of which a definite artefact will have been produced. In this framing, production is conflated with the production of meaning, i.e., significance is already constituted at the level of materials ('materials make meaning'), even as the metamorphosis of material in the process of artistic production always tends to push it in the direction of meaningful, culturally legible signs.[8]

6 Lehmann, 'Showing Making', 10.
7 Lehmann, 'Showing Making'; Latour, *Reassembling the Social;* Gell, *Art and Agency.*
8 Lehmann, 'How Materials Make Meaning'.



To this constellation, the present case of the destruction of musical instruments brings a carrier of meaning that starts another cycle of metamorphosis (from finished artefact to destroyed material) and entails an intrinsic destabilisation of meaning and meaninglessness; i.e. it indicates the potential space of the semantic loss. The destroyed instruments show that systems can break down and existing norms can be transformed into their opposites in an instant. The remains of the smashed violins, the actual pieces of wood, the loose strings and chinrests, may be preserved in art museums as evidence of the transgressive art of the twentieth century (see also Fig. 7), but they are nonetheless inbetween materials, they operate in a realm 'between meaning and meaninglessness'.[9] At the same time, they exist in the cultural consciousness primarily as photographic and filmic doubles which generate new versions of the piece *One for Violin Solo* and which create a juxtaposition of actors, times and places (Fig. 4). Hence the photographic and filmic documentation contributes to the precarious materiality of the piece and lends it the quality of reproducibility.

9 The experimental filmmaker Tacita Dean chose these words to describe the precarious status of the objects in Claes Oldenburg's *Mouse Museum* (1965–1977). See Müller-Helle and Dean, 'Transgressing Art, Resisting Nostalgia', 179.

What happens, then, when besides being subject to the dynamics of human and non-human actants the objects also happen to be constitutionally open-ended – as with *One for Violin Solo* – and always already spatially and temporally deferred by the pictorial technology of the photograph? Indeed, what happens when artistic material and its digital transformation can only be comprehended in this constant deferral of space and time?

3.

When Paik lifted his violin at the Kammerspiele in Düsseldorf on 16 June 1962, he was counting on the photographic documentation of his performance and its inclusion in the art-historical record by the Fluxus chronicler George Maciunas (1931–1978). Maciunas had taken it upon himself to instantaneously transform the ephemerality of fleeting actions into art history.[10] From the very outset, *One for Violin Solo* existed both as a time-bound performance and as a photographic document.

But to return to the evening of 16 June 1962: over the course of about five minutes, Paik had gradually raised the classical instrument with his arms outstretched, and then, in an explosive motion, brought it crashing down onto a table in front of him. Instantly the lights went up in the auditorium and the destructive sound of the impact filled the room. The instrument as an object – and an emblem of bourgeois culture – was transformed into a chaotic mess of splintered wood, violin strings and pieces of plastic strewn across the stage. Maciunas' photographic documentation[11] shows Paik with narrowed eyes and a concentrated posture, embodying the tension of the sensitive concert musician who converts the conventionalised gestures of a training in classical music – with the very tools of that trade – into an iconoclastic act. What this photograph does not show, though Maciunas did record it in a handwritten note, are the two time regimes at work here: the intense time of raising the violin and the sudden gesture of smashing it: 'Paik doing a violin solo, raised it very slowly (about 5 min) in concentrated manner & BANG!'[12] Maciunas' record also omits the fact that Paik's destructive performance was itself nearly sabotaged: the concert master of the Rhenish orchestra, who was sitting in the audience, tried to storm the stage to prevent Paik's action in the middle of the performance, but Joseph Beuys (1921–1986) and Konrad Klapheck (1935–2023) removed him from the hall.[13] This emotional reaction on the part of the concert master underlines the cultural meaning of the object within the tradition of musical practice – a meaning that was called into question by the destructive act of the artistic performance. In fact,

10 For George Maciunas, his position within the Fluxus movement and his historiographical practice see Schmidt-Burkhardt, *Maciunas' Learning Machines*.

11 We were sadly unable to secure the rights for reproducing the photography. Yet, the dissemination of the medially converted performance on the internet allows the reader to access the image under: http://www.medienkunstnetz.de/werke/one-for-violin-solo/bilder/1/ (accessed 25 June 20224).

12 Stooss and Kellein, *Nam June Paik*, 45.

13 See the conversation with Nam June Paik reprinted in Hoffmann, *Destruktionskunst*, 84.

the musical instrument was attacked not only materially but on every level of musical production and cultural significance; the temporal structure of Paik's precise script inverted the symbolic code of notation systems and the institutional framing of the stage situation.

Paik's performances from the early '60s sought to break out of their institutional framings; they took aim at the logics of art, music and theatre as part of a critique of the signification processes of bourgeois culture. The documentary practices of Paik and Maciunas made this critique visually iconic, though its effectiveness has become increasingly questionable over time. But Paik's actions were always conceived as mediated performances. He also used photographers for other actions, such as the 1963 exhibition *Exposition of Music – Electronic Television*, which was photographically documented by Manfred Leve (1936–2012).[14] Crucial to the question of the materiality of *One for Violin Solo* (and any other time-bound piece) is the issue of what we define as its fundamental material in the first place. Is it the fleeting performance of the piece at the theatre on 16 June 1962? Is it the remains of the musical instrument, the smashed wood and torn strings that are either thrown away or exhibited in art museums? Or is it the photographs and films which are usually regarded as documentation of the authentic performance?

Contemporary debates about the new manifestation of images on the internet, their circulation on social media and their distribution by algorithm have lent a new currency to the old question of how technologically produced images affect the traditional material of art history. In his 'Work of Art' essay of 1936, Walter Benjamin (1892–1940) not only emphasised how the new world of images would operate through film and photography; another essential effect of the technological world, he said, would be the repercussions of technological reproducibility 'on art in its traditional form'.[15]

Within this technological environment even a historical performance such as Paik's *One for Violin Solo* can again be recoded and exploited in an open-ended way for the multifaceted material it always was. This dispersal of the work in diverse images, media and technologies has determined its outward appearance ever since the 1960s: on 11 April 1964 Maciunas performed it at the Fluxhall in New York and had the performance illustrated in three silver gelatin prints.* These three black-and-white photographs, which are now retailed as art photography by the Carl Solway Gallery in Cincinnati, show Maciunas in a posture of tense restraint at three stages in the process of raising the violin prior to the act of destruction (Fig. 5). Ben Vautier (1935–2024) followed in Prague in 1966 and Charlotte Moorman (1933–1991) attempted a feminist appropriation of the destructive performance in her version of the piece at the Destruction in Art Symposium in New York (Fig. 6).[16] The black and white photography shows her tensely raising the

* You can find the images under https://www.artnet.fr/artistes/peter-j-moore/george-maciunas-ex%C3%A9cutant-one-for-violin-de-nam-rPF11_E1PGFXnLVn4qqUpw2 (accessed 30 October 2024).

14 See the interview with Manfred Leve in Grönert and Hackenschmidt, *Leve sieht Paik*, 10.

15 Benjamin, 'The Work of Art', 214.

16 For Charlotte Moorman's practice see the chapter 'Intimkörper (oder die Zerstörung der öffentlichen Form)' in Müller-Helle, 'Noise Bodies'.

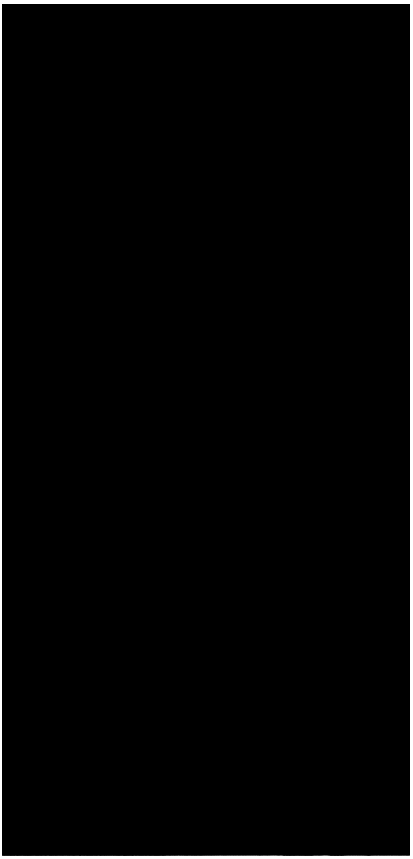


Fig. 5 Ben Vautier performs *One for Violin Solo* by Nam June Paik, Fluxus East, Prague 1966. Only in printed publication.

Fig. 6 Charlotte Moorman performs *One for Violin Solo*, Desctruction Art Symposium, September 1966.

violin in front of her audience. On the left side in the background, you can see the medial transformation in action: one spectator is recording the performance with his camera. While their photographs can still be attributed to the historic Fluxus movement, *One for Violin Solo* has recently been re-enacted countless times in teenagers' bedrooms, not to mention – as the Instagram account of the León Gallery in Manila shows – as an homage and part of a value-creation machine. Hence the appearance of *One for Violin Solo* was never confined to a single performance with a fixed place in space and time; it was always conceived as a multifaceted artwork. With this media-oriented form it is no longer possible to speak solely of a complete production process in which the artist transforms material to produce a meaningful artefact; the meaning of this new, technologised materiality consists in its multiplicity, its open-endedness and its virality. *One for Violin Solo* is subject to the far-reaching prognosis made by photo historian André Gunthert in 2009: 'Today, the value of images lies in the ability to share them.'[17] Ontologically decisive in determining the materiality of Paik's piece is its current appearance as both performance and digital photography; it generates an iconic image on the one hand and – as a carrier of information – a multi-part artefact on the other. In 'The Distributed Image' Peter Osborne has described this quality of digital photography as twofold, 'rooted in the moment when, for example, a photograph could equally function as data (information to be transmitted) and as something with narrative and aesthetic properties'.[18]

4.

What happens to traditional art theory in this technologised field? What happens to centuries-old terms such as material, metamorphosis and design when the research literature treats the destruction of musical instruments as a manifestation to negate existing concepts?[19] In aesthetic theory one feature of post-medieval art is the idea of the artistic process as a completion of the form through the annihilation of raw material. In order to differentiate the sphere of art from craft, an artistic process is supposed to '"annihilate" (Schiller), "negate" (Hegel) or – in neo-Platonic parlance – to "dematerialize" (Lyotard)' the raw material.[20] The smashing of musical instruments, which was commonplace in the traditions of cinema and jazz from the 1920s, was then incorporated into neo-avant-garde practices at the end of the 1950s and was disseminated from there into mass culture, inverts this traditional art theory of the transformation of raw material into a complete, shaped form.[21] In the destruction of instruments, the shaped form of the musical instrument, which has an iconic value alongside its practical use as a musical

17 Gunthert, 'Shared Images'.

18 Osborne, 'The Distributed Image', 74.

19 Monika Wagner sets methods of destruction in the context of the art theory on material transformation as artistic creation; see Wagner, 'Materialvernichtung als künstlerische Schöpfung', 114.

20 Ibid., 111.

21 See Schmidt, *Klavierzerstörungen*, 13–21.

instrument, again becomes shapeless material; at the points of impact the wood reveals its inner structure, the strings are torn, the form smashed.[22]

In classical avant-garde theory these objects of dissolution have been integrated into a theory of transgression; they function as cultural signs for the dynamic between tradition and revolution, established culture and subversive critique, institutional framings and liberation from them. Peter Bürger presented a theory of transgression for this form of critique as early as 1974, where transgression was understood as a liberating gesture to dissolve the boundaries between art and life and re-evaluate the realm of art within social systems. In his reading, the neo-avant-gardes and the historical avant-garde movements from the beginning of the twentieth century had failed to achieve this.[23] Moreover, it has been argued that 'iconoclash' and 'musicoclash' – terms coined by musicologist Denis Laborde in the realm of musical practice[24] – refer to the logic of profound historical developments that can be described as a 'fabulous large-scale experiment of nihilism' which also has the potential to serve as a fundamental critique of cultural values. Bruno Latour, organiser of the famous Iconoclash exhibition held at the Center for Art and Media in Karlsruhe in 2002, put it as follows: 'Everyone and every detail of what art is and what an icon is, an idol, a sight, a gaze, has been thrown into the pot to be cooked and burnt up in the past century of what used to be called modernist art'.[25] This notion of the anti-gesture as critique is now an established element in the historiography of art and has been canonised within its institutions (Fig. 7). For instance, the destroyed musical instrument from Ben Vautier's *One for Violin Solo* – smashed into pieces of wood and violin strings – is now exhibited in a framed box at the Walker Art Center in Minneapolis, which shows its transformation from a performative object to an image of destruction. It has been canonised as an emblem of transgressive art within the arts of the twentieth century. However, these iconoclastic practices complicate the structure of art-historical canonisation, a process that has recently been described by Hubert Locher as the creation of a 'group of works, objects, or texts, recognised within a defined social group'. According to Locher, the new group of objects represents the collective identity and the system of values 'to which the individual builds his or her own identity as a member of a society'.[26]

The original media conversion of destructive practices into the media of photography and film stabilises the iconic appearance of this anti-emblem while simultaneously feeding it into media circulation and contemporary digital culture. It also means that *One for Violin Solo* can no longer be adequately described by the parameters of artistic production, material aesthetics or institutional critique; the reproducibility of digital

22 For the iconic value of musical instruments see Müller-Helle, 'Gefährdete Objekte'.

23 For a history and critique of the concept of transgression see the introduction in Müller-Helle, *The Legacy of Transgressive Objects*, 9–18.

24 Laborde, *Kantuketan*, 254.

25 Latour and Weibel, *Iconoclash*, 21.

26 Locher, 'The Idea of the Canon', 31.

Fig. 7 Presentation of Ben Vautier's *One for Violin Solo, (1966, smashed violin, dimension: 17-1/16 x 17-1/16 x 3-1/4" framed)* Collection Walker Art Center, Minneapolis.

photography is part of its genesis as material and work. It was for good reason that Walter Benjamin, in his fundamental reflections on the reproduction of technological media, did not define the realm of the original artwork and its reproduction in simple terms of replication.[27] The crucial point is that the reproduction itself acts upon the original work: 'The work no longer appears only in its original place; now it also appears in any number of other places, namely wherever the recipient "in his own particular situation" happens to actualise it in the form of the reproduction'.[28] From this perspective, the functioning of photography and its dissemination on the internet makes significant incursions into the appearance of *One for Violin Solo* and other performance pieces which instigate a similar dynamic of latency and actualisation in new and unexpected versions and reiterations. The current definition of the material of artworks, as applied in the discourse of material studies, must therefore be expanded to include the material of technological images if it is to do justice to the technological encoding of art today.

27 Benjamin, 'The Work of Art'.
28 Geimer, *Theorien der Fotografie*, 143.

Bibliography

Benjamin, Walter. 'The Work of Art in the Age of Mechanical Reproduction' (1936). In *Illuminations*, ed. by Hannah Arendt, trans. by Harry Zohn, 211–244. London: Pimlico, 1999.

Bürger, Peter. *Die Theorie der Avantgarde*. Frankfurt am Main: Suhrkamp, 1974.

Geimer, Peter. *Theorien der Fotografie*. Hamburg: Junius Verlag, 2009.

Gell, Alfred. *Art and Agency: An Anthropological Theory*. Oxford: Clarendon Press, 1998.

Gillespie, Tarleton. *Custodians of the Internet: Platforms, Content Moderation, and the Hidden Decisions That Shape Social Media*. New Haven, London: Yale University Press, 2018.

Grönert, Alexander, and Sebastian Hackenschmidt, eds. *Leve sieht Paik. Manfred Leves Fotografien von Nam June Paiks Ausstellung ‚Exposition of Music – Electronic Television.' Wuppertal 1963*. Nuremberg: Germanisches Nationalmuseum, 2005.

Gunthert, André. 'Shared Images: How the Internet Has Transformed the Image Economy'. *Études photographiques* 24 (2009). https://journals.openedition.org/etudes photographiques/3436 (accessed 13 March 2019).

Hahn, Daniela. Beyond Evidence. *Das Dokument in den Künsten*. Paderborn: Fink Verlag, 2016.

Herzogenrath, Wulf. *Nam June Paik, Fluxus, Video*. Munich: Schreiber Verlag, 1983.

Hoffmann, Justin. *Destruktionskunst. Der Mythos der Zerstörung in der Kunst der frühen sechziger Jahre*. Munich: Verlag Silke Schreiber, 1995.

Hölling, Hanna B. *Revisions: Zen for Film*. New York: Bard Graduate Center, 2015.

–. *Paik's Virtual Archive: Time, Change, and Materiality in Media Art*. Oakland, CA: University of California Press, 2017.

Laborde, Denis. *Kantuketan: l'univers du chant basque*. Donostia: Elkar, 2002.

Latour, Bruno. *Reassembling the Social: An Introduction to Actor-Network-Theory*. Oxford: Oxford University Press, 2005.

Latour, Bruno and Peter Weibel, eds. *Iconoclash. Beyond the Image Wars in Science, Religion, and Art*. Cambridge, MA: MIT Press, 2002.

Lehmann, Ann-Sophie. 'Showing Making: On Visual Documentation and Creative Practice'. *The Journal of Modern Craft* 5, no. 1 (2012), 9–23.

–. 'How Materials Make Meaning'. *Nederlands Kunsthistorisch Jaarboek* 62 (2012), 6–27.

Locher, Hubert. 'The Idea of the Canon and Canon Formation in Art History'. In *Art History and Visual Studies in Europe*, ed. by Matthew Rampley, Thierry Lenain, Hubert Locher, Andrea Pincotti, Charlotte Schoell-Glass, and C.J.M. (Kitty) Zijlmans, 29–40. Leiden: Brill Verlag, 2012.

Muhle, Maria. 'Reenactment als mindere Mimesis'. In *Ortsbestimmungen. Das Dokument zwischen Kino und Kunst*, ed. by Eva Hohenberger and Karin Mundt, 120–134. Berlin: Vorwerk 8, 2016.

Müller-Helle, Katja. 'Gefährdete Objekte. Zur Zerstörung von Musikinstrumenten in der Kunst der 1960er Jahre'. In *Werkzeuge und Instrumente, Hamburger Forschungen zur Kunstgeschichte* 8, ed. by Philippe Cordez and Matthias Krüger, 169–183. Berlin: Akademie Verlag, 2012.

–, ed. The *Legacy of Transgressive Objects*. Berlin: August Verlag, 2018.

–. 'Noise Bodies. Bildzensur 1967/heute'. In *nach dem film* 17 (2019). https://nachdemfilm.de/issues/text/noise-bodies-bildzensur-1967heute?auHash=aBspi2KEKlSChuLCAdU9GkBSiHF-MY1LrYYMYGQHa0I (accessed 15 December 2023).

–. Bildzensur. Infrastrukturen der Löschung. Berlin: Wagenbach Verlag, 2022.

Müller-Helle, Katja, and Tacita Dean. 'Transgressing Art, Resisting Nostalgia: An Interview on Tacita Dean's Manhattan Mouse Museum'. In *The Legacy of Transgressive Objects*, ed. by Katja Müller-Helle, 177–92. Berlin: August Verlag, 2018.

Neuburger, Susanne. *Nam June Paik: Exposition of Music, Electronic Television Revisited*. Cologne: Walther König, 2009.

Osborne, Peter. 'The Distributed Image'. *Texte zur Kunst* 99 (2015), 74–87.

Rothöhler, Simon. 'Informationen, die Bilder haben. Zur Moderierbarkeit von visuellem Content'. *Zeitschrift für Medienwissenschaft* 19 (2018), 85–94.

Schmidt, Gunnar. *Klavierzerstörungen in Kunst und Popkultur*. Berlin: Reimer Verlag, 2013.
Schmidt-Burkhardt, Astrit. *Maciunas' Learning Machines: From Art History to a Chronology of Fluxus*. New York/Vienna: Springer, 2003.
Stiles, Kristine. 'Art and Technology, Introduction to Chapter 5', In *Theories and Documents in Contemporary Art*, ed. by Kristine Stiles and Peter Selz, 384–396, 903–905. Berkeley and Los Angeles: University of California Press, 1996.
–. *Concerning Consequences: Studies in Art, Destruction, and Trauma*. Chicago: University of Chicago Press, 2016.
Stooss, Toni, and Thomas Kellein, eds. *Nam June Paik: Video Time – Video Space*. Ostfildern-Ruit: Cantz, 1991.
Wagner, Monika. 'Materialvernichtung als künstlerische Schöpfung'. In *Material im Prozess. Strategien ästhetischer Produktion*, ed. by Andreas Haus, Franck Hofmann, and Änne Söll, 109–121. Berlin: Reimer Verlag, 2000.
Wolf, Rebecca. 'Materielle Kultur'. In *Handbuch Sound: Geschichte – Begriffe – Ansätze*, ed. by Daniel Morat and Hansjakob Ziemer, 32–38. Stuttgart: Metzler Verlag, 2018.

Coda and Perspective

Processes of Authentification in the Museum: Value Creation between Presentism and a Sensitivity to Historical Difference

Achim Saupe

Abstract

The question of the 'value of the past' is assuming an ever-greater role in social self-understanding. It has become a resource that is both highly sought after and hotly contested in the disputes about the interpretation of the past. The article analyses value creation in museums between two analytical poles: The relevance of the present for the understanding of the past and a sensitivity to historical difference. This is discussed in relation to the debate about the new ICOM museum definition from 2022. Furthermore, the article argues that value creation can be analysed as multi-layered 'processes of authentification'. A transparent communication of how authenticity and values are created is central for the museum of the twenty-first century.

According to François Hartog, we have been living for some decades in a presentist regime of historicity. This presentist regime is characterized by a lost sense of the future, as well as a lost sense of the difference between the present and the past.[1] The diagnosis of presentism inevitably implies a certain criticism. Presentism, the implicit reproach suggests, is too quick to subsume the past. According to this view, the notion that one can and indeed must understand each era from within its own contexts fell by the wayside sometime between the nineteenth century and the present day. Such conceptualizations often have overtones of Ranke's dream that historical understanding is based on 'disinterested pleasure'. It was of course clear to other theorists of nineteenth century history that any interpretation could be meaningful only against the backdrop of ideas that held sway at the time.[2] And in view, too, of the way in which the past is dealt with in public, the hypothesis of a new instrumentalisation of the past to serve present-day objectives that was not witnessed in the nineteenth century, seems to be taking it a little too far.

Compared with the historicism of the nineteenth century, the reference to the past in 'historicism 2.0'[3] would thus rather seem to be a gradual one: Traces and artefacts were already being transformed into historical phenomena, into monuments and memorials, and history enthusiasts were remembering and commemorating pasts and

1 Hartog, *Regimes of Historicity*.
2 Droysen, *Historik*.
3 Nolte, 'Öffentliche Geschichte'.

making them accessible to contemporary audiences in numerous newly founded historical societies and museums. People were of course fighting for other things and speaking other languages, some of which seem strange to us today. But what certainly does constitute a difference: the valorisation, marketing and commodification of the past has clearly increased as broad areas of life have become economised. It will scarcely be possible, however, to determine whether today, unlike in former times, the past is presented as an unfamiliar world, or whether it is imagined to be like our own; we can at most discuss individual cases. But a view of the past seems most serviceable if we understand it, as museums do, as a 'school of alienation', as Peter Sloterdijk and Gottfried Korff have emphasised with regard to museums in general.[4] Without sensitivity to difference, and the willingness to subject also our own values to a productive disruption, the view of the past becomes lifeless and dull. This is not to say it does not still risk having a legitimising effect. And nor does it mean that evidence-based or compelling interpretations, interpretive models and narratives must be discarded – quite the contrary. But they must be brought up to date again and continually renewed to ensure they are sound. Historical thinking is only any good if it takes place in relation to past contexts and in relation to our own present.

Values of the past and the present in the discussion about a new ICOM museum definition

This brings us to the difficult question of the values that colour our interpretations of the past, and of how many values should play a role or be imparted at all in memory institutions like museums. It is clear that the museum conveys past values in many ways: every collection reflects a particular regard for the things of past eras; it is not value-free, but value-relational. How do these inscribed values affect our understanding of the past, and with which values must we ourselves approach the collections when it comes to reinterpretation?

One very practical example of such questions is the current discussion about a new ICOM (International Council of Museums) definition, in other words about what the museum across the globe should be.[5] ICOM had tasked a commission led by Jette Sandahl with revising the current museum definition and updating it to meet the requirements of the twenty-first century. Together with her fellow committee members, the Danish curator, who has served among other things as director of the Women's Museum of Denmark and the Museum of World Culture in Sweden, proposed the following:

> Museums are democratising, inclusive and polyphonic spaces for critical dialogue about the pasts and the futures. Acknowledging and addressing the conflicts and challenges of the present, they hold artefacts and specimens in trust for society,

4 Korff, 'Das ethnographische Museum'; Sloterdijk, 'Museum – Schule des Befremdens'.
5 Thiemeyer, 'Politisch oder nicht'.

> safeguard diverse memories for future generations and guarantee equal rights and equal access to heritage for all people.
> Museums are not for profit. They are participatory and transparent, and work in active partnership with and for diverse communities to collect, preserve, research, interpret, exhibit, and enhance understandings of the world, aiming to contribute to human dignity and social justice, global equality and planetary wellbeing.

Unlike this politically charged suggestion, whose didactic pathos certainly contributed to the controversy it inspired, the final version of the ICOM museum definition from 2007, which is largely based on a definition from 1974, reads as if it could claim to be reasonably politically neutral:

> A museum is a non-profit, permanent institution in the service of society and its development, open to the public, which acquires, conserves, researches, communicates and exhibits the tangible and intangible heritage of humanity and its environment for the purposes of education, study and enjoyment.

This was of course not entirely apolitical either, for one thing because it conceived the museum as a place that was to remain detached from economic use and exploitation of its collections. Furthermore it attempted, as one would expect under the auspices of an international association, to bring all museums together, regardless of the political systems in which they carry out or have to carry out their work. While the new proposal emphasised critical dialogue, critics of the proposed definition could well have argued that the democratising agenda itself fuelled exclusion.

Criticism was directed very explicitly at the newly articulated political conception of the museum, which clearly took up critical positions and campaigns according to which there was no such thing as the 'neutral museums' implied by the old definition. Even some of its supporters thought the result sounded too much like jargon.[6] But they could also point to the fact that in the opinion-forming process, which had dragged on for more than two years, it had been clear from the outset that a new definition could no longer hide the (post-)colonial background to the creation of numerous museums. The opinion of representatives of museums in the Global South had been actively sought for precisely this reason.

More recent museum research has shown that museums have always been political institutions as well and have therefore always conveyed progressive, universalist, and European though sometimes also national and nationalistic, colonial and even fascist and of course socialist ideas. Their collections reflected the spirit of their creation, and political upheavals increased the will to imbue museums with a new spirit commensurate

6 Haynes, 'Plan to Redefine'. See also https://artstuffmatters.wordpress.com/museums-are-not-neutral/ (accessed 9 January 2023); as well as the report about a public debate in Berlin, organised by the HTW Berlin, in Gromova, 'Auf der Suche'; and Reifenscheid, 'Gegen Unverbindlichkeit und Politisierung'.

with the times. If we take this lesson seriously, it is impossible to view the museum of the twenty-first century, too, as anything other than a political place. It was in this vein that Sandahl justified the proposal of the commission over which she had presided: 'As museums become more and more conscious of the strong social role they play, there's a need for a more explicit platform of values from which we work. […] Saying that museums can only fulfil traditional functions or play these new roles is what I feel we've outgrown in the twenty-first century.' And countering the criticism that the new definition had a 'political' undertone, she said: 'When you say that something is political or ideological, well, is it political to work with marginalized communities and women, as many museums are doing now, or is it political not to?'[7] This was certainly a good argument against the apolitical museum. But is any definition not too broad that regards the museum as a trailblazer (or propagandist) for *'human dignity and social justice, global equality and planetary wellbeing'?* And are these kinds of values and catch-all terms not invariably amenable to such flexible interpretation that they can be co-opted even in authoritarian regimes or illiberal states? And who monitors whether museums have a democratising agenda?

The committee that prepared the 2019 proposal clearly wanted a more value-based – and decidedly contemporary – definition.[8] After a heated debate at the ICOM general assembly in Kyoto 2019 about the question if the proposal was more a political mission than a definition, and complaints about the consultation process of the members in general, a new global, 18-month long discussion process was initiated.[9] The new commission brought up two proposals, and in the end, the ICOM members voted in Prague 2022 with an overwhelming majority for the following new museum definition:

> A museum is a not-for-profit, permanent institution in the service of society that researches, collects, conserves, interprets and exhibits tangible and intangible heritage. Open to the public, accessible and inclusive, museums foster diversity and sustainability. They operate and communicate ethically, professionally and with the participation of communities, offering varied experiences for education, enjoyment, reflection and knowledge sharing.

This definition was obviously a compromise: It is still value-driven in relation to inclusiveness, participation, diversity and sustainability. The definition shows a process-oriented understanding of values, and it leaves out the democratising aspect as well as positive values like 'equal rights' or 'human dignity and social justice, global equality and planetary wellbeing', which defined universal common goals in the earlier proposal.

7 Haynes, 'Plan to Redefine'.

8 This was also the mission of the committee, see Sandahl, 'The Museum Definition'; see also ICOM, 'Museum Definition'.

9 The discussion process and the final report is documented under ICOM, 'Museum definition', and ICOM, 'Extraordinary general assembly'.

In contrast to the attempt from 2019, the new definition re-establishes somehow the authority of the museum, insofar as the museum is understood in the first stance as a 'permanent institution' and not as a place for 'critical dialogue'. But there is still a self-reflexive undertone, when it says that museums 'interpret' the past and not only 'communicate' knowledge. And it is still 'political', as communities are integrated in the museum work, which can be read as a result of debates over identity questions and the recognition of diversity.

While the new definition stresses the interpreting act of all museum work, the challenge of uncovering different possible interpretations and achieving a critical appreciation of different pasts – pasts that are not too hastily subsumed by the present – is not in the centre of the definition anymore. In contrast, the museum could be a central place for discussing and communicating the basic criteria for assessing, rethinking, raising, harnessing and resituating the 'value of the past' which would make the underlying processes of interpretation much more transparent than the definition that museums 'interpret' the past. The question is not that they interpret the past, the challenge is that they have to communicate how they do it.

In general, it can be observed that the question of the 'value of the past' begins to play a greater role in society's awareness of itself. In the political and social disputes about the interpretation of the past, and particularly in view of an age characterised by new media and sometimes described as 'post-factual', the 'value of the past' has become a resource of cultural self-re-assurance both sought after and contested, and today represents a battleground of identity. This comes as no surprise, because values find their justification not only in ethics, but above all through history – they may be understood as 'regulative ideas' of societies undergoing historical change.[10] Values are also attributes and qualities ascribed to things that are singled out as cultural heritage due to their social recognition and valorisation. At the same time, values always define belonging and otherness, sameness and difference, serving to build communities and to exclude others: Value debates play a crucial role in political and social processes of exclusion and inclusion. The commitment to and call for values has thus acquired greater social urgency in recent years, while also becoming an object of social conflict. Universal, humanitarian, religious, progressive or European values are, like the past, a discursive constant and guiding tenet when it comes to addressing social cohesion.

In the course of engaging with the underlying debates, and with a view to a fuller description of the value of the past, it is necessary to examine processes of value creation, value debates and competing values in terms of their impact on the privilege of interpretation and the historicity of values – while also making them transparent and accessible. From a position like this, values can be understood in the first instance as social and intersubjective relation: values are always benchmarks for others. The importance of the past as compared with the present and the future can be considered in this light, and a critical assessment undertaken of how different pasts stand in relation to

10 Sommer, *Werte;* Zeller, *Werte.*

one another. At the same time, the value of the past serves as a reference point for reflection and orientation while also referring to the cultural heritage and societal knowledge that is always open to reinterpretation. This value of the past thus correlates with the core beliefs of a particular society or milieu, which are always subject to change.

Communicating how values are created: 'processes of authentification'

This grounding in values pertains to all historicising activities. The aim of the Leibniz Alliance 'Value of the Past', that took up its work in 2021, is to gain a deeper understanding of historical and current practices of assessing, rethinking, raising, resituating and harnessing the value of the past in all their complexity and to discuss their underlying realms of meaning and horizons of validity. This will be approached from three overarching perspectives: Firstly, the research investigates the transformation of regimes of evidence in order to historicise practices of assessing value in historical disciplines; secondly, it scrutinises the spatiotemporal paradigms that underlie any attribution of value; and thirdly, it asks how the past was and is used as a public resource for identity construction, and which modes of appropriation affect, in what ways, our understanding of the past. The first point, namely the question of the transformation of regimes of evidence and their impact on our understanding of the past, builds directly on questions of historical authenticity that were studied and discussed in recent years by the Leibniz Research Alliance on historical authenticity (2013–2021).[11] The question of the extent to which the material authenticity of the ephemeral can be retained is thus also a question of values, as many of the papers in this volume make clear. The conservation and restoration sciences in particular are often faced with the problem of which temporal strata, and hence also which traces of the past and values – as with the preservation of historic buildings and monuments – should be retained at all: age value, artistic value, historical value, sentimental value, identity or alterity value, and perhaps even contested value.[12] The associated practices can also be understood as processes of authentification, authentication and authorisation.[13]

What is meant by this? The issue of the authenticity of objects has been frequently discussed in museum studies. German cultural studies expert Gottfried Korff regards the specific materiality of objects and their 'quality of sensuous and emotional appeal' as facilitating an emotional link to the past. In an increasingly media-driven world, Korff argues, the museum is one of the few places where it is possible to directly encounter

11 Kimmel and Brüggerhoff, Museen; Eser et al., *Authentisierung im Museum;* Sabrow and Saupe, 'Historische Authentizität'.

12 Riegl, *Der moderne Denkmalkultus;* Meier, Scheurmann, and Sonne, *Werte;* Dolff-Bonekämper, 'Conservation as found'.

13 See for the following also Saupe, 'Analysing Authentication'.

what has been passed down to us via 'relic authenticity' and the 'contrasting fascination of the authentic'.[14]

By contrast, constructivist approaches have often tried to demystify the authenticity phenomenon of the museum. It has been remarked critically that 'authenticity is not about factuality or reality. It is about authority.'[15] According to this viewpoint, authenticity is a culturally specific product and is attributed to things largely independently of their material substance or object biography. It is an effect of authorisation. Furthermore, authenticity in museums has been described as a 'rhetorical mode' which is generated within the framework of exhibitions by a 'pact'[16] or a 'collaborative hallucination' between visitors, exhibition makers and institutions.[17]

In the debate about the value and attribution of authenticity there are also approaches which try to build a bridge between such different concepts. For Siân Jones and Thomas Yarrow, specialists in the fields of archaeology and social anthropology, 'authenticity is neither a subjective, discursive construction nor a latent property of historic monuments waiting to be preserved. Rather it is a property that emerges through specific interactions between people and things'.[18] Jones' and Yarrow's conceptualisation of authenticity as an effect that arises from the interaction of individuals or groups with artefacts and things within places and environments that are relevant to their own historical self-understanding is very convincing. But it is not so much a 'property' as an attribution or ascription as part of a process of 'doing' and 'practising history', or as an effect that arises when people address and confront their past. And in the case of cultural institutions like museums, memorial sites and other heritage sites, we must bear in mind that they authenticate, authentificate and authorise objects, artefacts and places as authentic. These authentification (and authentication) processes are multi-layered: they are based on scientific practices (for example in the field of material and conservation science), on the arrangement of displayed objects, on the way in which historic places and sites are preserved, transformed and shaped, on the creation of a specific atmosphere[19] which enables people and visitors to reflect on their past, authenticity and identity, and last but not least, on cultural and societal values.

Scholarship with a historical component rely on two essential modes and practices of evidence generation, namely 'authentication' and 'authentification'. Within this definitional framework, 'authentication' primarily refers to scientific practices of identification and verification – for example, to determine the authenticity of a document or author, or undertake a closer examination of an archaeological finding using scientific methods. 'Authentification', by contrast, refers to processes and discursive practices by

14 Korff, 'Zur Eigenart der Museumsdinge,' 141.
15 Crew and Sims, 'Locating Authenticity,' 163.
16 Baur, *Die Musealisierung der Migration*, 30–31.
17 Kirshenblatt-Gimblett, *Destination Culture*, 167.
18 Jones, 'Experiencing Authenticity'; Jones, 'Negotiating Authentic Objects'.
19 Kerz, *Atmosphäre und Authentizität*.

which something is rendered credible and authentic. In this way, 'authentification' encompasses argumentation and narration, but also eyewitness accounts, traditions, rituals, and performances in which historical authenticity is generated.[20] 'Authentifications' are cultural markers and are thus important mechanisms for the construction of social reality or cultural values. 'Authentication' and 'authentification' – which, admittedly, may display significant overlap – thus serve to justify and legitimize historical knowledge. In this respect, analyses of historical authenticity are related to questions about the production of evidence in cultural studies, questions which have gained new weight with the 'cultural turns' of recent decades and research on material culture.

How, then, can scholars deal with the complex phenomenon of historical authenticity? First of all, we have to keep in mind that we can distinguish between two meanings of authenticity: subject-related authenticity (in the sense of personal credibility, being true to oneself, trustworthy, honest) and object-related authenticity (in the sense of materially genuine, empirically true, and authorised by an author or artist, etc.).[21] These two forms often interrelate with each other: Identifying something as 'true' or 'original' (a practice which remains indispensable even if we are, today, more interested in object biographies and the transformation of objects during time), or in pointing out that something is authentic in relation to a certain period of time, epoch or style of behaviour and thinking, and our interest in the subjective dimensions of what is told and how it is told and what kind of meaning this has for a certain group of individuals, often cannot be separated clearly. This also enables us to explain why claims to authenticity have such a powerful cultural impact. It is because they link the authenticity ascribed to historical objects, places, records and narratives with the subjective experience both of the individuals who produced, inhabited, told and used them in the past, and of our desires as recipients to obtain a vivid impression of the past.

Rather than simply attributing authenticity, or even taking it as an essence of things, it is therefore preferable to examine authenticity primarily in terms of communicational structures, i.e. to ask to whom and when authenticity is attributed, as well as how and why.[22] We can therefore analyse different authentication and authentification processes: Firstly, we can examine attributions of authenticity and claims to authenticity in different discourses as political and cultural arguments. Secondly, we can study cultural conflicts as conflicts over authenticity, identity and belonging: Claims to authenticity often have an instrumental character and are strategies designed to further political, economic and social goals in various national, regional and transnational contexts. Here authority and authorisation largely determine what historical subjects and societies choose to perceive as 'their' history or cultural heritage. Working on this premise, we can examine the conflicting nature of claims to authenticity in a number of contexts – for example in the

20 Sabrow and Saupe, 'Einleitung', 11. See also: Saupe, 'Historical Authenticity'.

21 Knaller and Müller, 'Authentisch/Authentizität'. For an adaption of the concept of 'subjective' or 'existential' authenticity in tourism, see for example: Steiner and Reisinger, 'Understanding existential authenticity'.

22 Lethen, 'Versionen des Authentischen', 209.

establishment of research paradigms, in collective identity, or in the presentation of exhibitions. Thirdly, we can examine academic and scientific authentification (and authentication) processes in dealing with history and historical remains. Ascribing authenticity is always a mode of generating evidence based on scholarly methods and practices, well-rehearsed rhetoric and socially anchored authentification rituals. We can therefore consider how scholarly styles of thinking, institutional and social frameworks and the practices and techniques employed by museums, archives, conservators and restorers concerned with cultural objects have influenced validation strategies over the course of history. Fourthly, we can study narratives and rhetorics of authentication and the media production of the authentic and its 'mediated immediacy'.[23] After deconstructing claims to authenticity in these different ways, we can finally reflect on how the value of the past, or even better, values of often contested pasts, are constructed and communicated. And as far as cultural institutions like museums reveal these strategies, they can not only create meaning, but also make it transparent, trustworthy and perhaps even authentic.

23 Jones, 'Mediated immediacy'.

Bibliography

Baur, Joachim. *Die Musealisierung der Migration. Einwanderungsmuseen und die Inszenierung der multikulturellen Nation*. Bielefeld: transcript, 2009.

Crew, Spencer R., and James E. Sims. 'Locating Authenticity: Fragments of a Dialogue'. In *Exhibiting Cultures. The Poetics and Politics of Museum Display*, ed. by Ivan Karp and Steven D. Lavine, 159–175. Washington: Smithonian Institution, 1991.

Dolff-Bonekämper, Gabi. 'Conservation as found – Erhalten wie vorgefunden?' In *Denkmalpflege für die Berliner Mauer. Die Konservierung eines unbequemen Bauwerks*, ed. by Axel Klausmeier und Günter Schlusche, 82–92. Berlin: Ch. Links Verlag, 2011.

Droysen, Johann Gustav. *Historik, Bd. 1. Rekonstruktion der ersten vollständigen Fassung (1857/58) und der letzten gedruckten Fassung von 1882*. Stuttgart, Bad Cannstadt: Friedrich Frommann Verlag, 1977.

Eser, Thomas, Michael Farrenkopf, Dominik Kimmel, Achim Saupe, and Ursula Warnke, eds. *Authentisierung im Museum. Ein Werkstatt-Bericht*. Heidelberg: Propylaeum, 2017. (= RGZM – Tagungen, Volume 32) doi: 10.11588/propylaeum.297.405.

Gromova, Alina. 'Auf der Suche nach einer neuen Museumsdefinition. Dokumentation des Streitgesprächs "Quo Vadis" am 30. Januar 2020 im Jüdischen Museum Berlin'. https://www.jmberlin.de/suche-nach-neuer-museums-definition (accessed 9 January 2023).

Hartog, François. *Regimes of Historicity. Presentism and Experiences of Time*. Translated by Saskia Brown. New York: Columbia University Press, 2015.

Haynes, Suyin. 'Why a Plan to Redefine the Meaning of "Museum" Is Stirring Up Controversy'. Time, September 9, 2019. https://time.com/5670807/museums-definition-debate/ (accessed 9 January 2023).

ICOM. 'Extraordinary general assembly'. https://icom.museum/wp-content/uploads/2022/07/EN_EGA2022_MuseumDefinition_WDoc_Final-2.pdf (accessed 20 June 2023).

ICOM. 'Museum definition'. https://icom.museum/en/resources/standards-guidelines/museum-definition/ (accessed 20 June 2023).

Jones, Sara. 'Mediated immediacy. Constructing authentic testimony in audio-visual media'. *Rethinking History* 21, no. 2 (2017), 135–153. doi: 10.1080/13642529.2017.1305726.

Jones, Siân. 'Experiencing Authenticity at Heritage Sites: Some Implications for Heritage Management and Conservation'. *Conservation and Management of Archaeological Sites* 11 (2009), 133–147.

–. 'Negotiating Authentic Objects and Authentic Selves: Beyond the Deconstruction of Authenticity'. *Journal of Material Culture* 15 (2010), 181–203.

Kerz, Christina. *Atmosphäre und Authentizität. Gestaltung und Wahrnehmung in Colonial Williamsburg, Virgina (USA)*. Stuttgart: Franz Steiner Verlag, 2017. (= Erdkundliches Wissen, Volume 161)

Kimmel, Dominik, and Stefan Brüggerhoff, eds. *Museen – Orte des Authentischen? Museums – Places of Authenticity?* Heidelberg: Propylaeum, 2020. (= RGZM Tagungen, Volume 42) doi: 10.11588/propylaeum.745.

Kirshenblatt-Gimblett, Barbara. *Destination Culture. Tourism, Museum, and Heritage*. Berkeley: University of California Press, 1998.

Knaller, Susanne, and Harro Müller. 'Authentisch/Authentizität'. In *Ästhetische Grundbegriffe. Historisches Wörterbuch in sieben Bänden. Volume 7*, supplement, ed. by Karlheinz Barck, Martin Fontius, Dieter Schlenstedt, Burkhart Steinwachs, and Friedrich Wolfzettel, 40–65. Stuttgart and Weimar: J.B. Metzler, 2005.

Korff, Gottfried. 'Das ethnographische Museum. Schule des Befremden?' In Times, places, passages. *Ethnological Approaches in the new millennium. 7th SIEF-Conference, Budapest, April 23–28 2001, plenary papers*, ed. by Attila Paládi-Kovács, 133–149. Budapest: Akadémiai Kiadó, 2004.

–. 'Zur Eigenart der Museumsdinge' [1992]. In *Museumdinge. Deponieren – Exponieren,* by Gottfried Korff and ed. by Martina Eberspächer, Gudrun Marlene König, and Berhard Tschofen, 140–145. Köln, Weimar, and Wien: Böhlau, 2002.

Lehten, Helmuth. 'Versionen des Authentischen: sechs Gemeinplätze.' In *Literatur und Kulturwissenschaften. Positionen, Theorien, Modelle,* ed. by Hartmut Böhme and Klaus R. Scherpe, 205–231. Reinbek bei Hamburg: Rowohlt-Taschenbuch-Verlag, 1996.

Meier, Hans-Rudolf, Ingrid Scheurmann, and Wolfgang Sonne, eds. *Werte. Begründung der Denkmalpflege in Geschichte und Gegenwart.* Berlin: Jovis Verlag, 2013.

Nolte, Paul. 'Öffentliche Geschichte. Die Neue Nähe von Fachwissenschaft, Massenmedien und Publikum: Ursachen, Chancen und Grenzen.' In *Aufklärung, Bildung, "Histotainment"? Zeitgeschichte in Unterricht und Gesellschaft heute,* ed. by Michele Barricelli and Julia Hornig, 131–146. Frankfurt: Peter Lang GmbH, Internationaler Verlag der Wissenschaften, 2008.

Reifenscheid, Beate. 'Gegen Unverbindlichkeit und Politisierung: Zur Neudefinition der Museen'. *Guest contribution for Wissenschaftskommunikation.de,* November 19, 2019. https://www.wissenschaftskommunikation.de/gegen-unverbindlichkeit-und-politisierung-zur-neudefinition-der-museen-32389/ (accessed 9 January 2023).

Riegl, Alois. *Der moderne Denkmalkultus. Sein Wesen und seine Entstehung.* Wien, Leipzig: Verlag von W. Braunmüller, 1903.

Sabrow, Martin, and Achim Saupe. 'Historische Authentizität. Zur Kartierung eines Forschungsfeldes'. In *Historische Authentizität,* ed. by Martin Sabrow and Achim Saupe, 7–28. Göttingen: Wallstein Verlag, 2016.

Sabrow, Martin, and Achim Saupe. 'Einleitung'. In *Handbuch Historische Authentizität,* ed. by Martin Sabrow and Achim Saupe, 9–15. Göttingen: Wallstein Verlag, 2022.

Sandahl, Jette. 'The Museum Definition as the Backbone of ICOM'. *Museum International* 71, no. 1–2 (2019), vi–9. doi: 10.1080/13500775.2019.1638019.

Saupe, Achim. 'Analysing Authentication and Authorisation Processes in Cultural Heritage and the Museum'. In *Museen – Orte des Authentischen? Museums – Places of Authenticity?* Ed. by Dominik Kimmel und Stefan Brüggerhoff, 35–24. Heidelberg: Propylaeum, 2020. (= RGZM Tagungen, Volume42) doi: 10.11588/propylaeum.745.

Saupe, Achim. 'Historical Authenticity'. *Bloomsbury History: Theory and Method* (forthcoming 2023).

Sloterdijk, Peter. 'Museum – Schule des Befremdens' [1989]. In *Der ästhetisches Imperativ. Schriften zur Kunst,* contributions written by Peter Sloterdijk and ed. by Peter Weibel, 354–370. Hamburg: Philo Fine Arts, 2007.

Sommer, Andreas Urs. *Werte. Warum man sie braucht, obwohl es sie nicht gibt.* Stuttgart: J.B. Metzler, 2016.

Steiner, Carol J., and Yvette Reisinger. *'Understanding existential authenticity'. Annals of Tourism* Research 33, no. 2 (2006), 299–318.

Thiemeyer, Thomas. 'Politische oder nicht: Was ist ein Museum im 21. Jahrhundert?' *Blätter für deutsche und internationale Politik* 10 (2019), 113-119.

Zeller, Christoph. *Werte. Geschichte eines Versprechens.* München: J.B. Metzler, 2019.

Appendix

List of Figures

Stefan Simon, Exploring Context and Values

Fig. 1–7: Stefan Simon

Stefan Brüggerhoff, Objects of Industrial Heritage

Fig. 1: Rainer Lippert – Public Domain, https://commons.wikimedia.org/w/index.php?curid=12103598/ (accessed 3 July 2023).
Fig. 2, 3: Stefan Brüggerhoff

Nadja Wallaszkovits, Digitisation and Restoration

Fig. 1, 5, 6: Bernhard Graf, Phonogrammarchiv Austrian Academy of Sciences.
Fig. 2: Bernhard Graf/Nadja Wallaszkovits, Phonogrammarchiv Austrian Academy of Sciences
Fig. 3, 9: Nadja Wallaszkovits, A/D Consult, Neufeld, Austria.
Fig. 4, 7, 8: Nadja Wallaszkovits, Phonogrammarchiv Austrian Academy of Sciences

Rebecca Wolf, Player Pianos

Fig. 1–7: Deutsches Museum/Konrad Rainer, CC BY-SA 4.0
Fig. 8: Scan: Deutsches Museum Munich

Katja Müller-Helle, Showing Unmaking

Fig. 1, 2, 3: © Ken Hakuta, Nam June Paik Estate
Fig. 4: Screenshot by Katja Müller-Helle
Fig. 5: Only in printed publication
Fig. 6: © Julia Abeles, courtesy Charlotte Moorman Archive, Charles Deering McCormick Library of Special Collections and University Archives, Northwestern University Libraries. As reproduced in Bassett, Dana. 'Returning "Topless Cellist" Charlotte Moorman to Her Rightful Place in the Avant-Garde'. In: Hyperallergic, March 17, 2016, https://hyperallergic.com/283971/returning-topless-cellist-charlotte-moorman-to-her-rightful-place-in-the-avant-garde/ (accessed November 15 2023)
Fig. 7: © Collection Walker Art Center, Minneapolis. Walker Special Purchase Fund, 1989. The image is available under http://walkerart.org/collections/artworks/one-for-violin-solo (accessed September 24 2024). © VG Bild-Kunst, Bonn 2024

Index (Persons, places, institutions)

List of Authors

Stefan Brüggerhoff was head of Deutsches Bergbau-Museum Bochum until June 2022. A chemist by education, his main field of research interest is conservation science, especially the preservation of industrial heritage. In 2012 he was appointed Honorary Professor by the University of Applied Sciences in Berlin (conservation of modern materials and technical heritage).

Patricia Falcão is a Portuguese time-based media conservator working at Tate. She researches and develops strategies for the preservation of software-based artworks and digital objects. More recently and in the context of the 'Reshaping the Collectible' project, this research has broadened to include the acquisition and preservation of web-based artworks. Patricia is also a collaborative doctoral research at Tate and Goldsmiths (University of London, UK) investigating preservation practices for software-based art in three different contexts: contemporary art museums, by artists and in the gaming industry.

Katja Müller-Helle is head of the research group 'The Technical Image' at the Humboldt-University of Berlin. From 2013 through 2019 she held a postdoctoral position at the Center for Advanced Study 'BildEvidenz. Geschichte und Ästhetik' (Pictorial Evidence: History and Aesthetics) at the Free University of Berlin. In 2014/2015 and 2018 she was a fellow at the Getty Research Institute, Los Angeles. Her research areas include history and theory of photography, media history, the historiography of avant-garde culture and theories of pictorial evidence. Among her recent publications is 'Bildzensur. Infrastrukturen der Löschung', Berlin: Wagenbach Verlag, 2022.

Marisa Pamplona is Head of the Conservation Science Department and Research Laboratory that she established at the Deutsches Museum in 2014. She was Conservation Scientist at the Rathgen Research Laboratory – National Museums Berlin from 2008 until 2013. She studied the durability of synthetic polymers used in stone consolidation during her Ph.D. in Engineering Sciences (2008) at the Technical University of Lisbon.

Achim Saupe is a historian and research fellow at the Leibniz Centre for Contemporary History, Potsdam (ZZF). He is the coordinator of the Leibniz Research Alliance 'Value of the Past'. From 2013 to 2021 he was the coordinator of the Leibniz Research Alliance 'Historical Authenticity', and between 2019 and 2022, principle investigator of the EU-HERA funded project 'en/counter/points'. His main research interests are Modern European History, 20th Century German History, history and theory of historiography, in particular in relation to the construction of historical authenticity, conceptual history, digital history, history & heritage, memory, commemoration culture & identity.

Julia Sawitzki received her Master's degree in restoration, conservation science and art technology at the Technical University Munich in 2018. Her work concentrates on the conservation of modern and contemporary artworks and cultural objects. From April 2018 she was a scholar of the Conservation Science Department at the Deutsches Museum in Munich. She has been working as assistant conservator at the Kunsthaus Zürich from January 2019 to April 2021. Until the end of 2022 she was supporting the depot-moving project of the Museums of the of Regensburg. She is currently working as conservator at the Vienna Museum of Science and Technology.

Stefan Simon has been director of the Rathgen Research Laboratory with the National Museums of Berlin since 2005. Trained as heritage scientist, Simon earned his PhD in Chemistry from the LMU, Munich. He served as a Council Member and Vice President of the International Centre for the Study of Preservation and Restoration of Cultural Property (ICCROM). As Inaugural Director of Yale's Institute for the Preservation of Cultural Heritage and Director of the Yale's Global Cultural Heritage Initiatives (2014–19), Stefan Simon prioritised the advancement of sustainable conservation strategies triggered by global climate change and the green

museum debate, and question of conservation documentation, authenticity and access in the digital age. Between 2001 and 2005 he led the Building Materials Sections at the Getty Conservation Institute, Los Angeles. Simon is a corresponding member of the German Archaeological Institute, has been recognised with Honorary Professorships at X'ian Jiatong Universtiy, China, and the Technical University Berlin. He has co-authored and published more than 150 articles on the preservation of cultural heritage.

Nadja Wallaszkovits is Professor of Conservation of New Media and Digital Information at the Staatliche Akademie der Bildenden Künste in Stuttgart. She studied musicology and audio engineering and lead the audio department of the Vienna Phonogrammarchiv as a specialist in audio restoration, re-recording and digital archiving. She is a consultant for archival technology for various international institutions and has been guest lecturer at the University of Vienna and at the Universities of Applied Sciences in Berlin and Bern. Wallaszkovits is Past President of the Audio Engineering Society (AES).
As an International Association of Sound and Audiovisual Archives (IASA) certified trainer, she is particularly involved in the IASA's Technical and Training, and Education Committees.

Rebecca Wolf is director of the Staatliche Institut für Musikforschung in Berlin. She is a musicologist with a focus on the cultural history of music and organology, on the history of interpretation and media studies. Rebecca Wolf served as visiting professor in Regensburg and Munich. She taught in Berlin, Stuttgart, Vienna, Zurich and Amsterdam. She was Alexander von Humboldt Fellow at Harvard University, and Fellow at the Max Planck Institute for the History of Science in Berlin. She has led the research group 'Materiality of Musical Instruments' at the Deutsches Museum, Munich. Rebecca Wolf's first book 'Friedrich Kaufmanns Trompeterautomat. Ein musikalisches Experiment um 1810' won the Award of Excellence of the Austrian Federal Ministry of Education, Science and Research.

Published so far

Volume 1 Dirk Bühler
Museum aus gegossenem Stein: Betonbaugeschichte im Deutschen Museum
urn:nbn:de:bvb:210-dm-studies1-9

Volume 2 Panagiotis Poulopoulos
New Voices in Old Bodies: A Study of ›Recycled‹ Musical Instruments with a Focus on the Hahn Collection in the Deutsches Museum
urn:nbn:de:bvb:210-dm-studies2-6

Volume 3 Hartmut Petzold
Eine Berliner Waage im Münchner Deutschen Museum: Geschichte, Hintergründe und Aktualität eines Museumsobjekts
urn:nbn:de:bvb:210-dm-studies3-2

Volume 4 Astrid Mignon Kirchhof (ed.)
Pathways into and out of Nuclear Power in Western Europe,
Austria, Denmark, Federal Republic of Germany, Italy, and Sweden
urn:nbn:de:bvb:210-dm-studies4-8

Volume 5 Walter Chinaglia
Towards the Rebuilding of an Italian Renaissance-Style Wooden Organ
urn:nbn:de:bvb:210-dm-studies5-4

Volume 6 Wilhelm Füßl (Hrsg.)
Von Ingenieuren, Bergleuten und Künstlern. Das Digitale Porträtarchiv »DigiPortA«
urn:nbn:de:bvb:210-dm-studies6-1

Volume 7 Andrea Geipel, Johannes Sauter, Georg Hohmann (Hrsg.)
Das digitale Objekt – Zwischen Depot und Internet
urn:nbn:de:bvb:210-dm-studies7-7

Volume 8 Charlotte Holzer
Das Kleid aus Glas: Eine Restaurierungsgeschichte im Deutschen Museum
urn:nbn:de:bvb:210-dm-studies8-3

Volume 9 Elisabeth Vaupel (Hrsg.)
Ersatzstoffe im Zeitalter der Weltkriege
urn:nbn:de:bvb:210-dm-studies9-0

Volume 10 Gun-Brit Thoma, Lorenz Kampschulte, Inga Specht, Doris Lewalter, Stephan Schwan, Olaf Köller
Wer geht in welches Museum? Vergleichende Besucherstrukturanalyse in den acht Forschungsmuseen der Leibniz-Gemeinschaft
urn:nbn:de:bvb:210-dm-studies10-7

Volume 11 Peter Donhauser
Oskar Sala als Instrumentenbauer: Ein Leben für das Trautonium
urn:nbn:de:bvb:210-dm-studies11-3

Volume 12 Artemis Yagou (ed.)
Technology, Novelty, and Luxury
urn:nbn:de:bvb:210-dm-studies12-0

Volume 13 Rudolf Seising (Hrsg.)
Geschichten der Künstlichen Intelligenz in der Bundesrepublik Deutschland
urn:nbn:de:bvb:210-dm-studies13-6