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MATERIALIZING MEMORIES

Dispositifs, Generations, Amateurs

Edited by Susan Aasman, Andreas Fickers & Joseph Wachelder

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How to Grasp Historical Media Dispositifs in Practice

Andreas Fickers

In search of the past user

The search for alternative ways of developing historical claims on past media practices starts from a concern with historical objects of media technology and how they can be used as sources for a sensorially focused history of technology and media. This article looks at the materiality of past media devices, beyond its function as sign and evidence of the past (Fickers 2007), and on the heuristic possibilities offered by an experimental approach to those devices. Although the study of material remains falls under the traditional craft of the historian of technology, especially when reappraising and presenting scientific and technical heritage in a museum context (Gleitsmann et al.2009), so far technology or media historians have hardly raised the issue of the sensuousness of technical objects beyond strictly aesthetic considerations (Heßler 2012; König 2009; Simondon 1958; Hörisch 2001).[1]

In recent years, however, the historiography on media and technology has frequently put the question of forms of appropriation and ways of using media technologies at the forefront of research. Instead of concentrating on production and invention narratives, historiography has focused increasingly on the processes of social construction, social appropriation or rejection, and on the symbolic significance of technology and technological artefacts (Edgerton 2008). Similar changes of perceptions in media historiography have resulted in attention for describing and analyzing users of media technology based on the more assertive, action-oriented concept of "user," instead of the sociological and media studies categories of "audience" and "consumer" (Ellis 2014; Oudshoorn and Pinch 2003).

In the argument below, therefore, I will try to gauge the epistemological potential of a hands-on approach to past media technologies by starting from an interest in sensing the past. I will do so by developing three lines of thought. First, I outline briefly the (thoroughly heterogeneous) conceptual and methodological features of media archaeology. Second, I sketch the heuristic surplus of an experimental expansion of the methodological repertoire of media archaeology, which is excessively geared to discourse analysis. Based on the concept of re-enactment, I address suggestions and lessons learned triggered by a critical reading of existing experimental approaches to the history of science, archaeology, or musicology. Third, I will explore the epistemological dimension of such an approach compared to the ideas of a "pragmatic use" of the concept of "*dispositif*" for doing media history as put forward by various scholars (Kessler 2003; Odin 2008; Steinmaurer 1999; Hickethier 1995; Weber 2014; Fickers 2014). These theoretical reflections will be contrasted with a critical assessment of concrete examples of media archaeological experiments, notably the "Staging the Amateur Film *Dispositif*" lecture performance at the Orphans Film Festival in Amsterdam 2014[2] and the "Glory and Misery of Dummyhead Stereophonic Recording" radio play co-produced by the Luxembourg Centre for Contemporary and Digital History and the Bavarian Public Broadcasting Service (BR) in 2016.[3]

Media archaeology as discourse analysis

Although media archaeology was intended to focus its analytical interest on the materiality and objects of communication technology, it has managed to deliver on this promise only partially (Winthrop-Young and Van den Oever 2014). To be sure, media archaeology studies by German authors such as Friedrich Kittler (1986 and 2013), Siegfried Zielinski (1985, 1989, and 2002), and Wolfgang Ernst (2002 and 2003) have started from a focus on devices and material objects, but they did so strictly from a discourse analysis perspective. These studies did not so much open up the object in its concrete materiality and tangibility, but they rather center on "texts" (in the semiotic meaning of the term, thus also images and sign systems), which are then interpreted by means of different theoretical concepts—such as Foucault's concepts of "archaeology" and "genealogy," Zielinski's concept of "variantology," or, as in the case of Erkki Huhtamo's studies, through Ernst Robert Curtius's concept of "topos" (Huhtamo and Parikka 2011). Although most of the cited authors also work with a genuine historical discourse approach, the theoretical borrowings and disciplinary traditions in which they operate are extremely heterogeneous. The field of media archaeology is therefore characterized by such a conceptual bandwidth and methodological diversity as to make it problematic to speak of a scientific field, at least in Bourdieu's sense of the term (Natale 2012). Erkki Huhtamo

and Jussi Parikka have rightly pointed out that many different ideas have informed specific studies in media archaeology: "Theories of cultural materialism, discourse analysis, notions of non-linear temporalities, theories of gender, postcolonial studies, visual and media anthropology, and philosophies of neo-nomadism all belong to the mix" (2011, 2).

What the various media archaeology studies have in common is that they are explicitly turned against a teleological media historiography, which, as implicitly alleged, perpetuates assumed narratives of progress rather than critically examining them (Parikka 2012a). Even if this mantra-like accusation levelled by some protagonists in media archaeology at (media) historians might be of a purely strategic scholarly nature, and in no way reflects the state of current media historiography (Ernst 2013b), the goal of many media archaeology studies, namely to write alternative histories of media and communication technology, is to be welcomed, also from the perspective of technology and media history. In this connection, "alternative" is most often used to describe the historical and contemporary potentiality of media and communication technologies, but not to reconstruct their actual development, dissemination, or appropriation in historical and critical perspective. Therefore, many media archaeology studies are primarily interested in those types of sources, which allow the imagined or configured users to come to the fore, as is the case, for instance, in literary presentations, advertising, and patents (Kümmel-Schnur and Kassung 2012). This media archaeology of the imaginary or even utopian potential, which is ascribed to all new media and communication technologies, has led to numerous historical discourse studies, which have made an important contribution to the cultural history of the media and media technologies (Sconce 2000; Sturken et al. 2004; Flichy 2007; Buschauer 2010; Huthamo 2013).

Re-enactment: grasping the materiality and sensuousness of historical objects

As valuable as these studies are for the historical reconstruction of past expectation horizons, which according to Charles Bazerman's concept of "heterogeneous symbolic engineering" (1999) or Mikael Härd and Andrew Jamison's concept of "intellectual appropriation" (1998) are always the result of a complex interplay of imagination, invention, and marketing strategies, they have very little to say about the complex process of the concrete appropriation and use of devices and objects in people's everyday life. Instead of focusing on the intellectual or mental appropriation, I will concentrate on methods and possibilities for "grasping" media and communication technologies in their concrete materiality and tangibility.

Grasping or comprehending is to be understood here as a hermeneutical act in the meaning given to it by Ernst Cassirer, which comprises both the intellectual as well as the sensory-physical appropriation:

Grasping or comprehending reality becomes a double act that also involved gripping on it: "comprehending" reality in linguistic—theoretical terms, and "comprehending" it through efficiency; the intellectual and the technical form.

1995, 52

In our view, one possibility of implementing methodologically Cassirer's hermeneutic concept of "grasping" (within the meaning of a critical and self-reflective historical scholarship) lies in the transposition of the concept of historical re-enactment in experimental practice. The idea of making re-enactment useful as a heuristic concept for historical scholarship stems from the British philosopher Roger Collingwood. In his pioneering study "The Idea of History," which appeared in 1946, Collingwood defines the concept of re-enactment as follows:

Historical knowledge is the knowledge of what mind has done in the past, and at the same time it is the re-doing of this, the perpetuation of past acts in the present. Its object is therefore not a mere object, something outside the mind which knows it; it is an activity of thought, which can be known only in so far as the knowing mind re-enacts it and knows itself as doing so. To the historian, the activities whose history he is studying are not spectacles to be watched, but experiences to be lived through in his own mind; they are objective, or known to him, only because they are also subjective, or activities of his own.

1946, 218

Although Collingwood emphasizes the significance of subjective experience in the process of historical knowledge generation, his philosophical reflections on the heuristic potential of the concept of re-enactment ultimately remains a typical ideal nature: historical knowledge is generated as an act of "intellectual understanding" (Dray 1985; Gerber 2012). If Collingwood's idea is expanded to a concrete, experimental dimension of knowledge generation, however, then the historian who is interested in objects and sensory aspects is afforded the possibility to gain concrete experiences with the physiological and sensory qualities of communication and media technologies, through the media archaeology method. If the sphere of the thought experiment in philosophy of history is relinquished for the benefit of an experimental access, objects and devices of history can be grasped in their technical, material, and sensory dimension.

"Thinkering": experimenting as style of thinking and education

Instead of a deconstructive discourse analysis, experimental media archaeology advocates a playful co-construction of its epistemic object (Rheinberger 2000). According to Michel Serres' plea for a history of the senses, which traces the wisdom of things beyond the prison of words, experimental media archaeology could turn the historian into an experimenter who becomes sensitive to everything evading pure description (Serres 1985). If experimenting is understood in the sense of Sönke Arens' differentiation of the exploratory and experimental form of discovering the world as a style of thinking which, instead of relying on a certain theory, is characterized by processes of collecting, tinkering, and translating, experimental media archaeology could make a contribution to historical *education*, which expands the conventional forms of historical learning to a dimension of sensing the past (Arens 2011).[4]

As a heuristic method, experimental media archaeology could provide new access to the study of past media practices and appropriation, which would assign the historian or archaeologist the role of an experimenter instead of that of a passive observer. A prerequisite in this respect is the creation of an experimental space where it is possible to experiment either with originals or with replicas in a creative and playful manner. This hands-on approach, called "thinkering" by Erkki Huhtamo (2011), must not function as a replacement of conventional media archaeology or media history methods, but should be understood as a methodological supplement, whose greatest heuristic potential lies on the didactic, educational front. As many studies in the field of experimental history of science have shown, the epistemological surplus of an experimental approach to the history of the sciences lies in exposing the complex interaction of objects, practices, ideas, and participants involved on the one hand, and in the experience of failure on the other (Heering et al. 2012; Heering and Witje 2011).

Drawing inspiration from experiences in experimental history of science (Breidbach et al. 2010), experimental archaeology (Schiffer and Skibo 1987; Saraydar 2008; Ferguson 2010; Schiffer 2013) and historically-informed performances in music (Lawson and Stowell 1999; Burt 2002; Bithell and Hill 2014), experimental media archaeology is geared to generating "knowledge that provides a springboard for action," which underscores the performative dimension of media and communication technologies in practice. This means that the intrinsic performative quality of devices and the interaction between user(s) and objects become perceptible in the experiment, after which they are described and reflected upon. Described by Breidbach et al. (2010, 18) as the cognitive mode of "heuristic touch," or as "colours of

"grasping" (Rheinberger 2015, 26), this process expands, in a playful and reflective manner, the relationship between the knowledge that provides springboard for action, theoretical knowledge, and ignorance. By definition it can never be the aim of this experimental approach to reconstruct an authentic historical experience of whatever nature. On the contrary, the aim is to create a situation in which available inventories of knowledge can be unsettled in a creative manner. Only such artificially generated tension between exploratory and experimental knowledge can lead to that experience that Sönke Ahrens refers to as "education" (as opposed to "learning" as a process of appropriating inventories of knowledge available and of facts considered certain.) (Arens 2011, 17–21 and 266–75).

Hands-on: for a "de-auratization" of historical media objects

In contrast to the precarious excavation objects of archaeology, the sensory experimental systems of historical scholarship, or the rare and valuable musical instruments of historically-informed performance, experimental media archaeology has the advantage that it has to do, in large measure at least, with mass produced industrial objects which have been handed down accordingly. Throughout the world, there are many private collectors of obsolete media technologies who collectively own hundreds of thousands of Morse and telegraph devices, radio and television sets, photo and film cameras.[5] The collections of museums specializing in the history of technology, communications, and the media in general also suffer from an oversupply of objects in this field. Furthermore, in the case of the history of science and experimental archaeology, the production of replicas has proved a tried and tested alternative method for the reproduction and re-enactment of historical experiments—an idea that is also becoming reality in the case of experimental media archaeology.

Whereas classical media archaeology, according to Wanda Strauven, is faced with the "observer's dilemma: to touch or not to touch," experimental media archaeology pleads explicitly for a hands-on approach, which entails Cassirer's double cognitive concept of "grasping" and "comprehending" (Strauven 2011). Accordingly, it also argues for a "de-auratization" of the media artefact: instead of holing historical objects up behind showcase glass and touting them as "masterworks" or "originals," experimental media archaeology could engage in a "dialogue with things," hopefully through constructive cooperation with curators and private collectors (Hahn 2010). In other words, by using things, we can not only analyze them in terms of their evidentiary and symbolic nature, but we may also perceive and reflect on their performative quality.

In this respect, experimental media archaeology promises interesting research options for material culture studies and for the history of design (Woodward 2007; Miller 2010; Fallan 2010). Whereas both these disciplines broach the materiality and symbolic nature of material culture from different angles and with different instruments, experimental media archaeology expands the analytical instruments through the concrete interaction with the object and opens up the possibility to study not only the "culture on the back of things," but to appropriate it in an ethnographic manner (Bloch 1985; König 2003). As such, it aims at a double de-auratization of the technical object, namely questioning the auratic display of technical objects as "artifacts" in museums and making their collections accessible as "living" objects for experimental research instead of storing them in depots, while making an important contribution toward opening the "black box" and researching the inner life of technical devices and equipment. The use of the rich collections of museums for experimental research into obsolete media technologies would do justice to the educational task of those institutions—with full understanding for the legitimate curatorial interests and tasks of museums and archives, of course (Samida 2010). Museums and archives could thus be turned into laboratories, into concrete venues for the experimental discovering of the world.

From archive to laboratory: reflections on experimenting in home mode

So far, the objects themselves have been the primary focus of analysis, not the way they are appropriated and used. If the idea of re-enactment is taken seriously, not only the technical devices and equipment are important in the media archaeology experiment, but also the place where these are appropriated and used, as well as the social constellation in which this occurs. If laboratories or workshops are seen as spaces of action, where different actors and actants engage in complex interactions, the question arises how this space is to be designed for media archaeology experiments. As the home or the home environment can be considered as the privileged locus for the appropriation and use of communication and media technologies, the arrangement of a domestic environment seems ever so appropriate for conducting media archaeology experiments. As the "central integration power" (Bachelard 1987, 33) and the "museum of the soul" (Praz 1994, 19), the home is the symbolic place for experiencing the whole of life, and as such it often is also the place for the "domestication" of new communication and media technologies (Silverstone and Hirsch 1994). The living room has a special role to play as a material and social ensemble, according to Hans Peter Hahn, as the privileged locus of conspicuous

consumption (2010, 13). The biographies of objects and their users are intertwined in the living room and are thereby consolidated into a socio-technical topography (Woodward 2007, 151–68). According to this hypothesis, this special topography should be taken into consideration in the experimental re-enactment, in order to be able not only to analyze the "language of things," but also to try the playful "dialogue with things" (Hahn 2010, 16; Riggins 1994).

An initial media archaeology experiment in the domestic appropriation of family films has shown the importance of understanding the experiment as a social, communicative, and collective practice. This experiment was conducted as a "performance" at the International Orphan Film Symposium 2014 in Amsterdam, in the context of a long-term historical research project on the cultural dynamics of home movies funded by the Netherlands Organization of Scientific Research (NWO).[6] This media archaeology experiment featured three scenes of domestic use of amateur film technology, based on a prepared script, representing the different possible amateur film dispositifs: first, the "8 mm dispositif" (with 8 mm camera, projector, and projection screen), second the "video dispositif" (with video camera, video recorder, and television set), and third the "mobile telephone dispositif" (with the mobile telephone as camera, recorder, and playback medium).[7] The purpose of this experiment was to attempt to confront the theoretical consideration on experimental media archaeology with practical experiences, or, in other words, to juxtapose explorative speculation with experimental practical knowledge. The major cognitive value of the public staging of the experiment was found perhaps in what Susan Aasman described as the "art of failure" in her review of the performance:

One of the biggest lessons was in fact a major failure. In the first scene, at a particular moment, the father failed to wind the reel in the projector. And even worse: when the film was finally in the projector, the lamp broke and we were unable to screen our home movie. Bad luck, but . . . the audience laughed. And even more surprisingly, they accepted this moment as part of the screening practice. They thought it was a moment that was scripted! That moment of laughter made us aware of the importance of people's relation with technology. And this becomes most clear at those moments when technology fails. Or better put: when people's interaction with technology becomes a struggle.[8]

Furthermore, the staging also aimed to leave behind the conventional forms of the transfer of knowledge at academic conferences (lecture) by a theatrical staging of the topic. A "lecture-performance" was chosen to enable the audience to take part in the research process, as well as to partake in findings through sensory perception. In her study entitled "Der Vortrag als Performance" [lecture as performance], Sibylle Peters argues that the

FIGURE 5.1 *Scene from the performance lecture "The Changing Dispositifs of Home Movies" at the Orphans Film Festival in Amsterdam, 2014.*

lecture-performance makes it possible "to affirm the performance of on-stage research—and in the broader sense the presentation of the artistic research—as a distinguishing feature and thus concurrently to subvert the scientific scheme of research versus presentation" (2011, 187). In other words, the idea of the media archaeology experiment as a medium for the generation of knowledge would be combined with the situation of the performance as the actual transfer of knowledge through the lecture-performance format.

If the social dimension of historical ways of media appropriation and use are to be investigated in the case of the experiment with the different family film *dispositifs* described here, role plays provide an opportunity to assign specific roles to actors participating in the experiment and thus have them experience how the production as well as consumption of family films frame "the home" and "the family" in equally large measure. As "formatted spaces of participation" (Müller 2009), spatial as well as socio-cultural factors shape the habits and rituals of all participants—those in front and those behind the camera, as well as on the projection screen or monitor. The complex social interactions played out in the background of production and consumption practices nonetheless influence the "result"—in this case the family film—which Martina Roepke has designated as "ensemble play" (2006). Our experiment has clearly shown that the re-enactment method can make an essential contribution to becoming aware of this "ensemble play" and thus to reflect thereon as a significant experience. This post-experimental reflection on the experiences through one's own body and senses changes with certainty the analytical perspective on traditional types of sources which, as argued at the start of this article, reflect certain types of users and experience each time. The media archaeology experience is not only the producer of a new type of knowledge inventory for the historical reconstruction of past media practices; it also changes the analytical perspective through its phenomenological dimension (Waldenfels 2004; Ihde 1986). Through experimental education, the historian's attentiveness changes and with it the critical perspective on traditional types of sources as well; the historical interpretation attains a new degree of complexity.

A second example might help to illustrate how doing historical experiments, re-enactments, or performative lectures may be capable of changing our historical imagination and interpretative framework. In the context of the research project "Failure and Success of Dummy Head Stereo: An innovation history of 3D listening," Stefan Krebs and Andreas Fickers produced a binaural radio play about the history of binaural stereo recording in collaboration with Werner Bleisteiner from Bavarian Broadcasting (BR) in Munich. While the post-doc research project by Stefan Krebs investigated the history of dummy head stereophonic recording technology and why it failed in the recording and broadcasting business,' the radio play was the
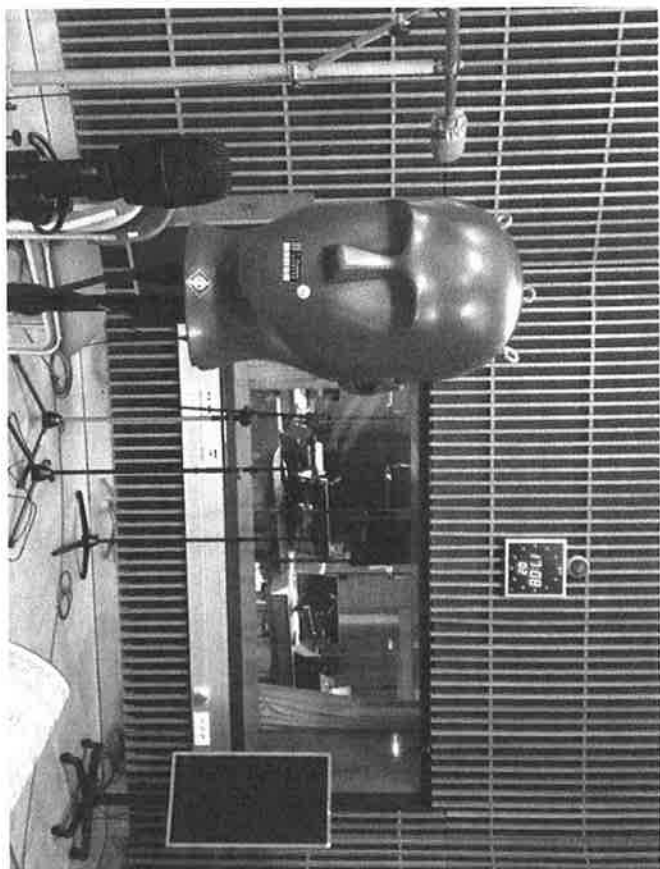
FIGURE 5.2 *Studio no. 9 at Bavarian Broadcasting in Munich, where the radio play Glory and Misery of Dummy Head Stereo Recording was produced in November 2016.*

result of a media archaeological experiment. The basic idea was to tell the story of dummy head recording and at the same time demonstrate binaural technology, its advantages but also disadvantages, to the listener—in short, to make the history of Kunstkopf technology immediately audible for the broader public.

The radio play, entitled *Glanz und Elend der Kunstkopf-Stereophonie* (*Glory and Misery of Dummy Head Stereo Recording*) and based on the historical findings of the research project, has a rather simple storyline: a radio journalist (stage actor Stephan Wurfbaum) interviews a media archaeologist (media historian Andreas Fickers) about the history of Kunstkopf technology. The challenge was, on the one hand, to tell this story for the broad audience: to explain binaural recording, to embed the story in the historical context, and to provide some reasons for the failure of Kunstkopf stereo—all in only twenty-one minutes! On the other hand, the radio play was supposed to let listeners experience three-dimensional audio reproduction and to make some of the major advantages and some of the technical problems intuitively audible—in short, to fully engage the sense of spatial hearing in listening to the radio drama.

The actual recordings took place in Studio 9 of Bavarian Broadcasting in Munich, a well-known studio for radio drama productions, and in some places outside the studio.[10] The production was supported by two technical and historical advisors: Stephan Peus (former sound engineer at BR, who recorded the first binaural radio dramas in Munich in 1973–4); and BR recording engineer Christian Schimmöller (who has a long standing interest in binaural recording). A special guest was the actor Hans Peter Hallwachs who played one of the main characters in the very first binaural radio drama *Demolition* in 1973, and agreed to speak the "Kunstkopf." Werner Bleisteiner had the great idea to give the Kunstkopf himself a role in the radio play. His idea was to record the voice of the Kunstkopf in mono, so that listeners could later locate this mono voice inside their head (a phenomenon called in-head-localization). In this way, the mono voice would nicely demonstrate the huge difference between the spatial quality of a binaural recording and the in-head localization of a mono recording.

While the two experiments briefly outlined here were quite different in nature and aim, they both told us a lot about the performative qualities of the past technologies in re-use and allowed us to grasp the complexity of historical media *dispositifs* in both sensorial and intellectual way. Both the performance lecture at the Orphans Film Festival and the production of the radio play in collaboration with professional actors and technicians made us aware of the "ensemble play" of the production process and—in a Goffmanian sense—of the role playing involved in the performative reconstruction of past media practices. The fact of speaking to/with a dummy head in a studio environment—which, from a phenomenological point of view is a very different communication situation than speaking into a "normal" microphone—produced a distinct historical experience different from appropriating the past by simply listening to original recordings or studying the literature. The studio (in the case of the radio play) or the stage (in the case of the performance lecture) created appropriate environments for experiences of historical immersion; they facilitated the creation of authentic and immediate multi-sensory experiences that enabled "the resemblance between the theatrical and the historical" (Gapps 2009, 403).

Conclusion: re-enactment as authentic memory practice

Experimental media archaeology is not about the reconstruction of as authentic a historical experience as possible. Instead it is geared to raising the awareness of participants in the experiment about the functionalities ascribed to the materiality of the object (what can and cannot be done with

a device), as well as the symbolic nature (design, semantics, interfaces), the explication of implicit inventories of knowledge and ignorance (knowledge that provides a springboard for action), the creative disconcertion of available knowledge (education through failure), the reflective analysis of the performative dimension of technical objects (object as medium), as well as the critical reflection of the situation dynamics in the experimental space (between the object and the experimenter as well as between different actors). Although authenticity is "a currency and competency standard within the reenactor's history work," as Stephen Gapps has put it, the reenactor/experimenter are charmed not by the original, but by its authentic simulation (2009, 398). It is the combination of old and new, the playful practice of locating, embodying and recalling that make reenactments or media archaeological experiments an authentic mode of communicative memory practice (Dreschke et al. 2016). As Tilmans, Van Vree, and Winter (2010, 7) put it: "Re-enactment is both affirmation and renewal. It entails addressing the old, but it also engenders something new, something we have never seen before. Herein lies the excitement of performance, as well as its surprises and its distortions." Reenactments and experimental approaches open up possibilities that allow history to be unfinished business (Gapps 2009, 207).

The heuristic method of re-enactment can be used to gain new insights into the temporality ascribed to the historical *dispositifs* of media technologies. The limited shooting time of 8 mm amateur film reels, the short playing time of a shellac record, and the long exposure times of photographic cameras—one will grasp all of this completely differently through the experimental approach to the object than through explorative readings of user's instructions or how-to manuals. Re-enactments, such as in makeshift laboratory spaces in the living room, moreover, enhance the reflexive awareness for the spatial and topographic dimension of past media practices, as regards both the production and the consumption of contents transmitted through media technology. This practical insight in the space-time conditionality of past objects and equipment provides a better historical and critical understanding of the constructivist nature of communication and media technology contents (photographs, films, audio recordings), which is frequently covered by the visual or acoustic evidence of these representations of realities. The knowledge that provides a springboard for action generated by the experimental approach thus makes an important contribution to historical source criticism and raises awareness among media and technology historians about the significance of the senses in the cognitive process as well as the sensuousness of technical objects (Smith 2007).

Compared to the heuristic potential of the concept of *dispositifs*—be it in the structuralist, socio-pragmatic, or historical variant (Bührmann and Schneider 2008)—the experimental media archaeology approach as sketched in this chapter emphasizes the importance of doing media history beyond

the discursive analysis of mediated representations of the past. In interacting with historical objects in a playful and experimental manner, the historian is turned into a self-reflexive ethnographer, producing "historical" knowledge through intellectual, perceptual, and bodily engagement with historical media *dispositifs*. This approach is faced with two challenges: a practical challenge and a methodological one. The first is linked to the difficulty of getting your hands on musealized or archived historical objects, which are often surrounded by an aura of being unique/original or by the many challenges involved in the production of replica. The methodological challenge follows from the difficulty of translating implicit knowledge, sensory perceptions, and in-situ experiences made during the experiments into intelligible information—be it in the form of literary descriptions (e.g., a written notebook or research diary) or in the form of audio/visual documentation (e.g., video or sound recordings). In other words, the challenge consists in making the implicit explicit by means of self-reflexive second order observations and thereby promoting a critical and problem-based approach of doing media history in an experimental mode of knowledge generation.

Notes

1 This dimension is not addressed in the classical introductions to the history of technology in the German-speaking world at least (see Heßler 2012; König 2009). Already in 1958, the French philosopher Gilbert Simondon attempted to sketch a philosophy of the history of technology beyond the duality of form and function. Simondon's works were scarcely appreciated outside France, however (Simondon 1958). For the history of the media, Jochen Hörisch presented a study motivated by the history of the senses entitled "Der Sinn und die Sinne," which, albeit inspiring, is often restricted to associative outlines (Hörisch 2001).

2 See: https://www.c2dh.uni.lu/thinkering/amateur-film-dispositif-media-archaeological-experiment

3 See: https://www.c2dh.uni.lu/thinkering/listening-past-two-ears

4 Learning as an "explorative form of discovering the world" and education as an "experimental form of discovering the world" constitute a complementary relationship of necessity, according to Sönke: "The frequently encountered intellectual separation of the learning of facts and playful experimenting as an activity, which occurs independently from those facts, entails an essential separation of what structurally belongs together, namely: learning as facts considered certain so be able to open up an unforeseen event in an educational process" (Arens 2011, 271).

5 For thousands of collector's pages on the Internet, see the "Museum of Obsolete Media": www.obsoletemedia.org

6 For details on the project and its manyfold outcomes, see the scientific blog of the project: https://homemoviesproject.wordpress.com/about/project/

7 A short film montage of the experiment/"performance" produced by Tim van der Heijden is available at: http://vimeo.com/95314562

8 Details of the project, a documentary film sequence of the experiment, and a critical review by Susan Aasman are available at: http://homemoviesproject. wordpress.com/report-staging-the-amateur-dispositif/

9 For details on the research project, see the scientific blog of Stefan Krebs: https:// binauralrecording.wordpress.com/

10 The radio play was recorded in November 2016, the final cut was done in January 2017, and it was first broadcasted by the Luxembourg public service radio station Radio 100.7 on June 11, 2017. The radio play is introduced by a short radio feature from 100.7 journalist Kerstin Thalau about the research project. You can still listen to the radio broadcast online here: https:// www.100komma7.lu/program/episode/151018/20170611930-20170611112000. Please do not forget to listen with headphones (only)!