Introduction

Exposing the Film Apparatus

Fossati, G.; van den Oever, A.

[Link to publication](#)

Exposing the Film Apparatus

Giovanna Fossati and Annie van den Oever

> The technology of the modern media has produced new possibilities of interaction. [...] What is needed is a wider view encompassing the coming rewards in the context of the treasures left us by the past experiences, possessions, and insights.—Rudolf Arnheim, 2000.[1]

PART I
THINKING ABOUT TECHNOLOGY

| 13

This book is not about the philosophy of technologies but rather about the film apparatus and its exposure in past practices of use and archival practices today. Nonetheless, it seems appropriate to recall here the claim made by philosophers that "it is largely by technology that contemporary society hangs together."[2] Unsurprisingly, technology's impact on society has been debated for more than a century by philosophers. From the start, the young institution called "cinema"[3] has also received much attention from a number of thinkers. There have even been film scholars who have argued that film history is the history of its technology.[4] And it is evident that the history of film theory has been punctuated by theories of technology. In many of these theories, the (experiential) impact of film on the viewers plays a crucial role. One need only look at the considerable number of thinkers (some of them filmmakers too) who theorized on technology to see the extent of its influence: Louis Delluc, Germaine Dulac, Jean Epstein, and others on *photogénie*, enlargement, and the close-up; Sergei Eisenstein, Vsevolod Pudovkin, and Dziga Vertov on montage; Rudolf Arnheim on techno-perception; and André Bazin on the aesthetic impact of film technologies such as 3D. These theorists affected film studies in major ways. More recent examples are media archaeologist Erkki Huhtamo—who keeps a collection of apparatuses himself—and philosopher Stanley Cavell, who helped establish the Harvard Film Archive. Both have written about the experiential qualities of film technologies—Huhtamo on failed technologies and small and big screen technologies,[5] and Cavell, most importantly, on the typically powerful and shared "big screen" experience.[6]

Exceptionally influential were Jean-Louis Baudry and Christian Metz, who developed the so-called "apparatus theory," which states that the cinema is ideological by its very nature precisely because films seem created to represent reality and yet the apparatus of the cinema is used to induce a passive, defenseless, dream-like state in viewers. From the 1970s onward, the theory of the apparatus has been widely discussed by many: Jean-Louis Baudry has problematized "*l'appareil de base*," or the basic equipment of the cinema, coining the term "dispositif" in his famous 1975 article;[7] Jean-Louis Comolli and Giorgio Agamben have reflected on technology and ideology; Christian Metz has dissected the psychoanalytical mechanisms underlying cinema viewing; and Laura Mulvey has analyzed the Hollywood-induced "male gaze."[8]

Not only film scholars but also major 20th-century philosophers were prompted to rethink the impact of (media) technologies on culture, which had a considerable impact on the field of film studies. The most obvious example is Walter Benjamin. He responded to Paul Valéry's thoughts on the "profound impact" of the "birth" of film on the arts and the techniques used in the arts.[9] Benjamin reassessed the "rupture" in perception and aesthetics created by the new cinema machine and, more generally, the effects of mechanical reproduction on the "aura" of the artwork.[10] Another obvious example of an influential writer was media theorist Marshall McLuhan, whose work was as much inspired by the new era of television as it was by Harold Innis.[11] A third example—this time from the era of digital media—is Friedrich Kittler, who inspired attention for the medium's materiality and the distinction between *technische Medien* (technical media) such as photo and cinematographic media, and other communication media such as language.[12] Yet others have had a considerable impact on the field of film and media studies such as Bernard Stiegler, who constructed a post-phenomenological account of the mediated experience,[13] and Paul Virilio, who explored the "logistics of perception" and the ways in which media technologies and wars are tied together.[14]

More recently, an overall concern within media studies has been how the philosophies of technology created in response to major technological transformations—by Benjamin, Heidegger, McLuhan, Kittler, Stiegler, Virilio, and others—might have contributed in turn to the modification of media studies and film and media archiving and some of its key concepts. A second concern has been whether there is perhaps something distinctly cyclical to this in the sense that the intervals in which theorizing on technology took priority came after major technological inventions and were intercut by intervals of relative silence with regard to the question of technology (e.g., the decades in which author theories or narrative theories dominated). A third concern has been whether and how the theoretical shifts instigated by Benjamin, Heidegger, Kittler, and others could be made productive for the field of media studies as

well as the fields of media art and media heritage studies, and film and media archives.[15] If cinema—which as a practice is ruled by hardware—is affected at a very practical level by the introduction of new technologies, these concerns and questions are even more pressing. Since the beginning of the digital era, contemporary scholars have been preoccupied by theoretical and philosophical issues related to the context of (digital) media technologies, thereby reassessing film history and film theory once again. It is the objective of this book to contribute to this enterprise by taking the perspective of the film archive into account from the practical side of the collections of apparatuses stored in them. More specifically, it is this book's aim to do this by "exposing" the apparatus, that is, by presenting a myriad of reflections on a great variety of devices stored in the film archive. This is part of the larger enterprise of reframing and reassessing the history of film and other audio-visual media as closely connected to both the history of technology and the history of art.

FILM HISTORY AND THE HISTORY OF TECHNOLOGY

It has been noted many times before that the history of the cinematic medium has established itself from the very beginning as a technological history. However, when one studies the historiography of the cinema from the outside, as Benoît Turquety has done in a series of studies,[16]—that is to say, when one re-establishes it within the context of the social sciences of the time—an "odd coincidence" emerges.[17] As Turquety indicates, the reasons for cinema to originally perceive of itself as primarily technological were numerous and complex: patents were formulated in technological terms, and so were their economic implications. Moreover, from early on the teaching focused on the mechanisms of illusion which the new moving-image technologies allowed. Between approximately 1895 and 1925, essayists writing about "moving pictures" saw it as their task to describe "the evolution of the machines" as well as "the historical-ideological determination of the important innovations."[18]

It is one of the ironies of history that during the interval in which film was perceived as technological, the history of technology as a discipline was not yet founded. The very rise of technology as a discipline only took place during the early 1930s. That was the time when technology entered the sciences as a major topic in nearly all disciplines. Meanwhile, film began to perceive of itself more as an art form rather than a technology. A strange coincidence indeed, this discrepancy between the histories of film and technology.[19]

How could it happen that the history of film lost interest in technology precisely at that moment when technology attracted the attention of (cultural) historians, philosophers, and scientists simultaneously? This is a crucial

question. It hints at the extraordinary link between film and technology at that point in time: cinema providing the cultural model for technology that itself was perceived within a conceptual sphere centered on film, which embodied some of its most characteristic features: "the mechanical, the modern, involving speed and vision," as Turquety wrote.[20]

Digitization profoundly changed our relation to technology once again. Turquety came to the conclusion that if film still is a "technological art" today, it may well be "that what we mean now by *technology* is not what was meant by the term when the cinema was institutionalized," because today "our contemporary concept of *technology* has shifted to another conceptual sphere," that of computers, and cinema's place in it "is not central—if it exists at all."[21] He continues:

> At the time of mechanization, *technique* and *technology* were cinematic notions; in the digital era, the link between the *cinema* and those concepts has changed, because the paradigms have changed around them, perhaps the *episteme* itself.[22]

What may we learn from this? Perhaps that, although the very beginning and the very end of the 20th century have often and illuminatively been described as historical moments in which the "new media" changed the cultural landscape,[23] we should not speak of the similarities between the two all too easily. Rather, we must understand that the transition from analog to digital in cinema created uncertainty once more about the identity of cinema and an epistemological shift, which was disorienting for the field (notable in the use of our concepts and terms) and from which we have not yet fully recovered.[24] Conjointly, the term "media" won prominence. Rather than "new technologies," the label "new media" has been in use since the 1990s. A renewed interest is currently emerging among media scholars for film heritage and film archives. Their objects of research are old and often obsolete media (historical collections) as well as new media devices (contemporary collections). Similarly, film archivists are turning to media scholars to help them redefine their role in today's media landscape as they seek to reframe the role of their collected objects (films as well as special collections, including apparatuses) in a time of technological transition in which such devices are changing so radically. Obviously, with such interplay, the way in which the shift to digital is interpreted has a great impact on the way a film archive defines its role today. Embracing the shift to digital as the "death of the cinema"[25] could lead to an archiving policy focused on collecting and exposing the past 120 years of celluloid cinema and its related technology. But if one considers digital cinema as the inevitable next step in the development of a medium which is *inherently transitional*, this may lead to a new archiving

policy which is focused on showing the medium, that is, the film apparatus, as indeed inherently transitional.[26]

TERMINOLOGICAL PROBLEMS

Creating terminological clarity in this field may be problematic for at least two reasons. First, due to the conceptual confusion created by the epistemological shifts that marked the development of the field in the past century, a word (cinema, machine, screen) may still be the same but its network of meaning may well have completely changed over time, affecting the meaning of the term in profound ways. And second, the constant transitions in these media practices have caused names to change frequently—from patent name to firm name to brand name to type name or generic name and so on—making terminological instability an undeniable fact. Therefore, some clarifying words are needed here before we can take a closer look at the technical devices in the film archive. We will focus on the key terms (technique, technology) used in this book.

The word *technique* (derived from the Greek word *techne* for art or craft) originally indicates ways of doing. The Greek word τεχνικος (technikos) means "of or pertaining to art, artistic, skilful". The term "technikos," which is the etymological root of "technique," situates the technical in the field between art and hardware—in other words, between technology (as knowledge of techniques) and knowledge of a skill or art.[27]

The word *technology* first entered the English language in the 17th century and referred to a field of study, not an object of study.[28] What was considered to be the object was, in fact, the machinery, the *mechanical* devices to be studied at that point in time.[29] In other words, the term *technology* refers to the knowledge or *logos* [literally the *word*s] needed to study, invent, develop, produce, and use the material devices. Whereas the word *technique* strictly refers to the method or procedure and not the hardware, as we call it today, the term *technology* relates to the discourses about techniques, whether scientific or prescriptive, discourses which can be studied as cultural objects in themselves.[30]

However, thanks to the technological revolutions of the 18th and 19th centuries—which brought us the elevator, the steam engine, the train, and last but not least the photo camera and the new "cinema machine" or "cinematograph"—the term *technique* came to connote both the machine and the way in which this machine was used. It is for this reason that restricting the definition of technology to simply the knowledge about technical inventions now sounds obsolete in English.[31] Technique and technology are now often used as synonyms, but from a scientific point of view, it is important to also acknowledge that the understanding of the specific dialectics between the

knowledge and development of machines and the development of their (artistic) use is nullified from the start "by any theory which reduces to one those practices that interact as two," as Rick Altman has convincingly argued for the fields of film theory and the theory of cinema history.[32]

Clearly, the histories of technological inventions and the histories of their use can only party be written separately.[33] Source material may reveal that the reflections on the procedures of use by engineers invited new technologies.[34] Similarly, it may uncover the often unexpected ways in which a new device was turned into a valued medium. Let us clarify this with an example.

The Cinematograph

The cinematograph invented by the Lumière brothers is an example of a turn-of-the-century technological device which is known to have spurred the technological imagination of engineers.[35] In a Surinamese newspaper of February 25, 1898,[36] an anonymous journalist summed up the more than fifty different terms that were used by technicians to label the new technical inventions and patents. The extensive list of terms clearly indicates the powerful impact of the new Lumière technology on other technicians' imaginary:

> [...] kinegraaf, kinetograaf, kinematograaf, kinematoterm, kineoptoskoop, kineoptikon, kinematoskoop, kinebleposkoop, kinegrafoskoop, kinevivagraaf, kinesetograaf, photokinematograaf, photoskoop, motophotoskoop, phoiotroop, mutoskoop, motorgraaf, movendoskoop, mouvementoskoop, manimatoskoop, theatograaf, vitagraaf, vitaskoop , vitaphostoskoop, eieroskuop, kathoskoop, magniskoop, mutoskoop, phonendoskoop, gerialgraaf, sterioptikon, fammograat, zoograaf, biograaf, heligraaf, velegraaf, rollograaf, artograaf, vivendograaf, vita-motograaf, kinestereograaf, badizograaf, heliecinegraaf, phautograaf, panoramograaf, pantobiograaf, pantomimograaf, chronophotograaf, photochronograaf, scenamatograaf, pictorialograaf.[37]

We can learn several things from the journalist's long list of names. First of all, it indicates how difficult it was for journalists at the turn of the century to get a firm terminological grip on the new invention and the new experimental and performative practices of showing moving images to audiences, which were even more ephemeral and short-lived than some of the inventions themselves. The problem surfaced as part of a new media practice and it would take decades before the list would crystallize into the handful of names audiences use as labels for established media practices today: cinema, cinematography, film,

18 |

film show, movies. That these names have stood the test of time indicates, in retrospect, that the practices of use to which they refer somehow stood out, in economic or other terms. The journalist's problem also hints at the complexities of the use of terminology experienced by writers, researchers, and archivists today: the list of terms that remains after some months, years, or decades have gone by differs considerably from the list of terms that is available and valued at any particular moment or in the earliest phase of conception. An evident example is provided by the terms used to refer to head-mounted displays, which have been reframed and renamed many times since the early 1990s. Depending on their source material and perspective—be it retrospective or contemporary—archivists and scholars will have to pay attention to the use of brand names versus type names, generic names, or names referring to certain formats,[38] as is done in several contributions in this book.[39]

The long list of names also suggests that the Lumière cinematograph deeply affected and inspired other turn-of-the-century inventors, who hoped to profit from this lucrative invention themselves by slightly changing the new technology and putting the seemingly new invention under the protection of a patent of their own! Moreover, the cascade of minor and major inventions created at that point in time indicates the many different ways in which technicians envisioned the new technology to be further developed for a great variety of potential future uses. Many of these would inevitably fail to be profitable. In this sense, the list of names may also remind us that the path of development from new technology to valued and established medium is long and rocky. As C.W. Ceram states in his classic exposé of the "archaeology of the cinema": "What matters in history is not whether certain chance discoveries take place, but whether they take effect."[40]

His statement reveals a very specific position in media studies. Obviously, Ceram was also aware that there was a long list of now forgotten, old, lost, and obsolete technologies, but to his mind, only the ones which had not been forgotten and/or had been or still were successful deserved a proper place in the history of film:

> Knowledge of automatons, or of clockwork toys, played no part in the story of cinematography, nor is there any link between it and the production of animated "scenes." We can therefore omit plays, the baroque automatons, and the marionette theatre. Even the "deviltries" of Porta, produced with the camera obscura, the phantasmagorias of Robertson, the "dissolving views" of Child, are not to the point. All these discoveries did not lead to the first genuine moving picture sequence.[41]

Ceram's position was to be famously inverted by Errki Huhtamo, as he clarified what he himself understood to be a proper "archaeology" of the media, which is an archaeology in the sense of Michel Foucault's *Archaeology of Knowledge* and Walter Benjamin's idea of a cultural history: an archaeology countering ideas of technological and historical progress.[42]

Contrary to Ceram, then, Huhtamo suggests one should "embrace all forms of cultural artifacts as material for theory." Indeed, his view of history explicitly included "discursive production" and in particular "the historically recurring discursive patterns" which he labeled "topoi."[43] These topoi, he argued, help to lay bare lost and forgotten futures of media which had never crystallized yet properly express the (lasting) desires and visions that are as much a part of a history of culture (in the sense of Benjamin) as are the material media objects used, stored, and studied.

It seems to us that, in terms of the film archive, the long list is indeed of great value to the archivists as well. Although such a list may not be on a par with a material collection of over fifty objects that can be physically studied, it does provide inside information needed to contextualize the archival objects in the collection as part of a dreamscape of media, envisioned for future use. Or, in Huhtamo's words:

> [T]he "excavation" of the ways in which these discursive traditions and formulations have been "imprinted" on specific media machines and systems in different historical contexts, [contributes] to their identity in terms of socially and ideologically specific webs of signification.[44]

Such excavations provide the valuable discursive landscape that hints at the user's desires and motives driving the development of media culture.

THE TREASURES LEFT TO US

In an interview in 2000, Rudolf Arnheim expressed an acute awareness of the importance of a vision on media technology by stating that "the technologies of modern media" had produced new and rewarding forms of interaction. He also envisioned new research agenda. What was needed, to his mind, was a vision on media technologies which would encompass "the *coming rewards* in the context of the treasures left us by the *past experiences*, possessions, and insights."[45]

It seems to us that in order to understand the future rewards of the new technologies which are currently and rapidly flooding the market, we must study the archival collections of technological objects in context, as the his-

torical apparatuses may provide insight not only into unexpected past media experiences but also, when properly contextualized, into past media practices and unexpected and forgotten forms of use.

From a film archival point of view, we may add that film technologies uniquely invite the study of the one medium that affected the audiences of the last century perhaps more profoundly than any of the other visual media to date. It is now common sense to speak of film as the visual medium of the 20th century. Somehow, film was able to reach audiences at a size and scale never before seen in history (and this includes the newspapers and the popular novel of the 19th century), thus paving the way for TV as a mass medium.

Why did this new visual medium captivate the audience's imagination so easily and take hold of it so profoundly, and for such an extended period of time? And to what degree may these effects be ascribed to the way in which these new moving-image technologies were used? Early cinema studies is one of the sub-disciplines in media studies which was tasked with providing answers to these questions, thus helping to rewrite history under the label of a New Film History. Unsurprisingly, perhaps, early cinema studies came into being more or less simultaneously with new media studies, which was picking up on the impact of new digital devices since the late 1980s. These new disciplines were able to lay bare some of the effects and affects created by the new visual technologies in their early days. Like digital information and communication technologies today, the new cinema machine had sensitized turn-of-the-century enthusiasts to the properties of the new medium and to having notable so-called *media experiences*, which is to say, experiences triggered by the performance of the apparatus itself, including the machine's infamous limitations, such as the grayness of low-contrast images, the baffling lack of sound, the weird movements of humans walking, the unusual proportions of humans and things, and so on. All these features were carefully framed by the projectionists to exploit the audience's enthusiasm by deepening the experiential effects.[46]

Today, much is known about the interaction of past audiences with new media, but what about future media experiences and insights? Perhaps, like Arnheim, we should ask ourselves what we can learn from these past interactions in terms of the coming rewards of today's new media? And who better to reference if not Arnheim, who, born in 1904, lived through an entire century of technical innovation? He began writing his now famous essays on film in 1925.[47] From the start, his focus was on two eminently important things: the visual media in general (and the film apparatus in particular); and the technologies of vision, that is to say, the perceptual and cognitive techniques used to process the visual information.

As early as the 1930s, Arnheim articulated the connection between the

limitations of the new cinema machine, which could *not* flawlessly represent reality (as many euphorically claimed), and *film as art,* as his book title would have it. His interest in film stemmed from an enthusiasm for the "expressive capabilities of the visual," and film, in this regard, offered a wealth of new examples, as he recounted in an interview in 2001. He was primarily occupied with the question of how the new cinema machine could represent the world through moving images, which is to say, a representation of the world "limited by the screen," as he would have it. These very limitations allowed him to conclude that:

> [F]ilm could never be a simple reproduction of reality. On the contrary, filmic images have the ability to shape reality and produce meaning. Film *interprets* the visible world through authentic phenomena from this world and *thus takes hold of experience*. Film is not a direct representation in contrast to the indirectness of art; rather, it is a form of artistic expression.[48]

In retrospect, it is obvious that Arnheim was pointing at the very quality, born from the technological limitations of the new cinema machine, that would help it to reach audiences on a unprecedented size and scale: its power was to take hold of the viewer's experience by shaping reality and producing meaning. That is to say, part of its captivating power was that it blurred the line between representation and expression. To many, movies had succeeded in bringing one closer to reality than any other technology before, including photography. In fact, movies came confusingly close to the real perception of reality. Indeed, one need only read Maxim Gorky to realize that a certain amount of confusion was part and parcel of those early viewing experiences.[49] Unsurprisingly, then, contemporary artists were quick to pick up on the very specific expressive qualities and experiences the new moving-image technologies provided.[50] Hence, they started experimenting with them, integrating them into their own art practice. According to Tom Gunning, it was the young artists from the historical avant-garde movements in particular who were interested in experimenting with the transformations in experience these new technologies could provide.[51] Furthermore, as early as the 1910s, they had started doing avant-garde "performances" or "manifestations," which were in some ways quite similar to the early film shows, as these typically provocative and evocative public meetings also aimed at eliciting strong experiential effects in audiences.[52] Interestingly, appropriations of this kind resurface through time. Comparable avant-garde performances (such as the ones created by Andy Warhol), for instance, followed the introduction of TV as a (mass) medium in the late 1950s and early 1960s, triggering a new, post-war avant-garde move-

ment. Two decades after that, in the 1970s, a new invention called "video" spawned a new art form called "video art." And more recently, the new media of the 21st century has resulted in artistic "experiments" that are now labeled "media art," which is perhaps the most productive art form in museums at this point in time.[53]

THE GENEALOGIES OF ART AND MEDIA ARE INTERTWINED

It has been argued before that the genealogies of art and media are intertwined, as they are inherently connected.[54] Our main point is that artists, in addition to engineers and technology developers, also tend to experiment with the effects of technologies, and that they too play an important role in the process of appropriating new technologies in culture. It seems that innovations in one field may easily trigger innovations in the other. This phenomenon obviously is of great interest to all who want to know more about the coming rewards of new media technologies that Arnheim talked about. If we want to follow up on his imperative, we should start identifying art museums, specifically those marked as modern art museums, as treasure troves of media objects and media experiments. It is then up to media scholars to contextualize and historicize these collections as part of media history. Art museums are treasure troves for more than one reason: only a very small part of the intertwined family histories of art and media have been studied in academia by film and media scholars and art historians. Ostensibly, a collaboration between these fields could be highly productive. So far, different types of experts (be it in the fields of art, technology, or media) have framed their research questions within very different approaches to art and media respectively.[55] But were we to combine questions from different fields the way Arnheim proposes, the results could be very rewarding.[56] Such a cooperation may include film archives, media archives, media museums, and technology museums. Science museums also contain huge collections of apparatuses, many of them used for communication and information purposes (e.g., the Science Museum in London before it reorganized its collection and stored its media objects in the National Media Museum in Bradford). Unsurprisingly, perhaps, art and technology museums as well as film and media archives have had very different attitudes and approaches towards their collections of (media) objects, and in particular towards the apparatuses in their collections. The reason is simply that "film," "technology," and "art" have been framed in entirely different epistemological realms. Moreover, these fields themselves have changed over the course of a century and indeed have done so quite profoundly, as Paul Valéry predicted, recalling that the "fine arts were developed, their types and uses were established, in

times very different from the present."[57] He envisaged that given "the amazing growth of our techniques" and the new "ideas and habits they are creating," some profound changes would take place:

> We must expect great innovations to transform the entire technique of the arts, thereby affecting artistic invention itself and perhaps even bringing about an amazing change in our very notion of art.[58]

Though Valéry articulated his prediction in the context of the changes of the last century, his words seem to fully apply to the situation today. When basic notions such as "art, "technology," "film," or "media" change considerably—even to such a degree that the word *media* no longer refers strictly to news-papers—then inevitably the archival enterprise with regard to apparatuses may be expected to change too, in ways we will take into consideration when reframing the basic value for media and media heritage studies of collections of apparatuses in archives and museums, as is done in the rest of this book.

PART 2
THE ARCHIVE AS A RESEARCH LABORATORY

> [T]o imagine an old technology as something that was once new means, therefore, to try to recapture a quality it has lost.—Tom Gunning, 2003.[59]

One of the prerogatives of university-embedded apparatus collections is that they exist mainly for research and education purposes. Universities, unlike museums and archives, are not focused on collecting unique objects; their main concern is (hands-on) research and education. Such archival conditions, which allow for work on replicas and redundant devices, invite a hands-on experimental approach that is practical by its very nature. Proceeding from an archaeology which is primarily discursive in its focus (as in the Foucauldian / Benjaminian tradition), the experimental and practical nature of these conditions calls for a new archival practice. In this book, we propose to reframe the archive as *a research laboratory*, that is, a place that allows hands-on research on its objects and enables us to study the materiality of the medium,[60] the specific formats used, its experiential impact, and its discursive context. The "laboratory" is a place where old media can be tested and where historical practices of use can be taken into consideration by simulating them in order to study effects as part of research.

The technological and cultural transitions of these last decades invite us

to rethink the current position of the film apparatus in the archive and, more broadly, the technological objects in media archives and art and technology museums and their value in presenting a wider vision of the technology of modern media today. In this regard, the treasures left to us in archival collections are truly indispensable: by understanding the way they operate and the cultural role they used to have, and by using them for reconstructions of past experiences, we may help to envision what is to come for modern media technologies. The focus on the apparatuses and the corresponding essays collected in this book all originate from this very idea: to reconstruct the use of apparatuses and to rethink their cultural impact and archival significance from various academic disciplines by simulating a laboratory research environment in the *presence* of the apparatus.

This second part of the introduction will primarily address the background, aim, scope, focus, and structure of this book, situating it in our wider aim of reframing the archive as a research laboratory. In the first part, we have sketched the broader questions this book aims to address and the discursive tradition it maintains a dialogue with, and we have hinted at a new research agenda. Here we want to address the background of apparatus collections. We will focus in particular on the collections held at the Film Archive Groningen and the EYE Film Institute Netherlands. Both institutes have been instrumental in how this project started and took shape through a number of initiatives and plans, including the Symposium *The Film Archive as a Research Laboratory* (Groningen, February 15, 2013), which was hosted by EYE and the University of Groningen.[61] In line with the plea for new experimental directions as expressed in the book *Techne/Technology*,[62] we invited scholars and archivists to let themselves be inspired by the apparatuses they encounter in the film archive, choosing its materiality and practice of use as the central focus of their analysis. From the start, our objective was to promote a renewed dialogue between media scholars and archivists (which we think is crucial for the future of our field of studies) by initiating new research in which the interplay between media theory and archival practice is central.[63]

THE APPARATUSES IN FILM ARCHIVES AND MUSEUMS

An object-driven approach to the study of apparatuses held in film archives, strengthened by a close dialogue between archivists and scholars, is particularly urgent today for a number of reasons.

In the world of film archives, many changes are taking place due to the shift to digital technologies (as means of production, distribution, and access *and* as instruments for research). Therefore, the questions about the role of

the equipment in the history and development of film and cinema are ever more relevant today. As not only the technologies but also the practices of use and their conceptualizations are rapidly changing, exploring the significance of the past and present of the media apparatuses becomes essential to reflections on how to preserve, restore, exhibit, and research them.

The way apparatus collections have come into being is partly subject to the same mechanisms used to build any other collection. As eloquently discussed by Derrida in his seminal work *Archive Fever* with regard to the archival practice in general, logics of power have, directly and indirectly, dictated collection policies and selection criteria throughout the first century of film history.[64] Obviously, this includes the archival activities with regard to the film apparatus. Moreover, apparatus collection is, like any other collection, also subjected to factors leading to fragmented, inaccessible, and filtrated archives, as discussed by William Uricchio.[65]

One more element to be taken into the account is that, other than film reels, which have often been collected and archived as "carriers of information" rather than as "material artifacts," collections of film apparatuses can be more easily compared to other forms of museum collections where the material artifacts are central and where collection criteria are different and typically stricter. This includes the (media) objects collected by museums of modern art and the technological devices gathered in technology or science museums already mentioned here.[66] Whereas archives tend to be as complete as possible in their collection and preservation activities with regard to the scope of their collection (e.g., all films or books produced or published in a certain nation or related to a certain theme), art museums typically have a more restrictive selection policy based on historical and aesthetical criteria. Other aspects of selection criteria in art museums are, for instance, the exemplarity (choosing one object as exemplary for many similar ones) or the curatorial propensity for certain objects.[67]

Additionally, it is particularly important to bear in mind that apparatuses, and all film-related or special collections, have commonly had a peripheral role in the tradition of film studies and archival practice. In the study of film as well as in the practices of collecting and archiving film, the moving image (what today is often referred to as "content") has been central, in as far as the focus was mainly on film aesthetics and textual analysis. Less attention, however, was given to film artifacts and lesser still to film-related artifacts, which, as the name suggests, consisted of nearly everything that was related to the film experience (think of cinema posters, decors, stills) as well as that which made the production and projection of films possible (cameras, laboratory equipment, projectors, sound systems, etc.). There were, of course, exceptions to this approach to film study, in particular in the stream of research that has focused on the history of film technology.[68] Furthermore, two influen-

tial events should be mentioned here that have played a seminal role in how we approach film theory, film history, and archival practices today. With the emergence of the so-called New Film History in the late 1970s, a new generation of historians dissatisfied "with the surveys and overviews, the tales of pioneers and adventurers that for too long passed as film histories"[69] emerged that would revitalize the study of early cinema. Additionally, the conference of the International Federation of Film Archives (FIAF), held in Brighton in 1978—which has since become emblematic of the renewed dialogue between film archivists and scholars, and early film scholars in particular, focusing on the archival treasures to (re)write film history[70]—was an important turning point. After this landmark conference, a shift took place away from film theory, dominant during the 1970s, to film history, or rather New Film History, which famously led to a reinvestigation of what has come to be known as "early cinema."[71] Several early cinema scholars—Ian Christie, Frank Kessler, Sabine Lenk among them—have contributed to this book. The strength of the new scholarship, in our opinion, lies in the ability to fuse film theory and film history, "bringing the insights of theory to history and vice versa," as Joshua Yumibe, a contributor to this book, put it only recently.[72]

These new approaches challenge the film-centered approach, which has been adopted by film archives since the 1930s. Within that older framework, collecting so-called film-related material (i.e., posters, stills, and company archives) was usually done as a source for research, typically aimed at learning more about the films in the collection. The same applied to film equipment, such as cameras, projectors, and so on, which was either used for research or because the historical equipment could still be used for projecting obsolete film formats. In some cases, archives gathered apparatuses and related documentation with the intention of illustrating the technological history of film.[73]

The position of film-related collections—and particularly apparatus collections—within film studies and film archiving has changed in the last twenty years. As already discussed here, with disciplines such as media archaeology becoming an integral part of media studies programs, and film museums displaying their collections in new forms of exhibitions, the shifting role of apparatus collections, from the periphery to the center, is quite palpable. In this regard, it is also worth referring to a general phenomenon that has been taking place for some years now in various disciplines, including museum and media studies: the "material turn."[74] Identified by some as a *counter effect* to large-scale digitization, this renewed longing for the experience of the materiality of the medium rather than its virtual representation can be found in work by filmmakers and artists alike.[75] Seminal examples of artists and filmmakers who have prioritized the "material" in their work are Gustav Deutsch, Bill Morrison, and Tacita Dean—in particular her exhibition FILM (Tate Mod-

ern, 2012). Many more could be added to the list. As Erika Balsom points out, with digitization, "[a]nalog film found itself under threat of obsolescence and reappeared as a major component of artistic practice for the first time since its displacement by video."[76]

Clearly, the "material turn" can be interpreted as a reaction to the digital turn, emphasizing the haptic interaction with the material as opposed to the experience of the virtual immateriality of digital access. There is a nostalgia to the here-and-now of the physical, material experience as opposed to the deferred possibility of ubiquitous online access.

Additionally, today's general public has a much closer and more physical relationship with the technological devices for filmmaking than ever before in history, because we now all make, edit, and distribute films, simply because most of us carry such technologies with us in the shape of the extraordinary invention called the *smartphone*, in which the integration of film apparatus and moving image archive is realized, as is aptly pointed out by Roger Odin in the first chapter of this book.

Besides the various collection mechanisms that could determine what item or device should be included in an apparatus collection or film (reel) collection, it should be noted that in practice, apparatuses have more often than not reached archives by chance, as a donation of passionate collectors and their families. In others cases, the personal interests of curators were a driving force for the acquisition of a device or collection. Apparatus collections have rarely been determined by a canon, nor have they been strictly driven by explicit policies. By contrast, films have been, and still are, often collected and preserved based on cultural canons (a well-known example being the Anthology Film Archive's Essential Cinema) and/or institutional collection policies often related to implicit or explicit frameworks of reference.[77] In the worst case, the collections were removed, either due to the lack of a policy or for practical reasons such as lack of storage space or budget for professional, technical, and curatorial support. These premises are true for the apparatus collections at the Film Archive Groningen and EYE as well. Before sketching the background of these two collections, let us briefly look at what has made these archives come together to form a collaboration concerning their apparatus collections.

THE APPARATUS COLLECTION COLLABORATION

The Film Archive embedded in the University of Groningen and EYE are naturally drawn to each other due to a shared history with regard to their collection and a shared ambition with regard to what to do with it. These shared histories and ambitions go as far back as the early 1990s when a group of pioneers—

among them Eric de Kuyper, Emile Poppe, Tjitte de Vries, and Ati Mul—in the adjacent fields of film studies and film archiving and collecting brought the film archive into the university for students to be engaged, hands on, with the object of their study. Thus, a new generation of film scholars and archivists was born, and today they work as film scholars and archivists. We feel we are part of this generation and with this book wish to contribute to this tradition by revitalizing it once again, taking it into new directions. By focusing on the margins of discourse, we hope to draw attention to the apparatus collection, a topic which has long been neglected by media scholars and archivists alike.

It should be mentioned that there are a number of important scholars, archivists, and curators who have indeed dedicated their work to the collection and study of the media apparatus, focusing especially on the pre-cinema. We have already mentioned several scholars in part one who have demonstrated the value of knowledge of technologies as well as apparatus collections. Other film archivists and curators who need to be mentioned in this regard are Laurent Mannoni at the *Cinémathèque Française*, Donata Pesenti Campagnoni at *Il Museo del Cinema di Torino*, and Nikolaus Wostry at the *Filmarchiv Austria*. They, along with a number of notable archives such as those at the *Museu del Cinema in Girona*, the *Museum of the Moving Image* in New York, the Film Archive in Frankfurt, and the Media Museum in Bradford have all focused on the apparatuses in their collection and have been initiating special exhibition and research activities for several decades now. Within academia, Humboldt scholars in the Kittlerian tradition experimenting with digital apparatuses need to be mentioned too. And we would be remiss if we did not acknowledge Erkki Huhtamo, who not only helped to establish Media Archaeology as a practice or subdiscipline within film studies[78]—succeeding where others before him failed in shifting the focus of study towards the apparatuses—but who also collected apparatuses and works hands-on, as we do, on his collection with his students. As we mentioned before, it is indeed one of the privileges of university-embedded apparatus collections that they can be used for hands-on research and education.[79]

The Film Archive at the University of Groningen

Due to a generous donation,[80] the library of the University of Groningen has had an extensive film archive at its disposal for several years. This archive offers a remarkable display of the developments that professional and amateur film have gone through.[81] Around 2,800 films dating from as early as 1907 can be found in the archive. Most of these are 16mm, but there are 8mm and 35mm films as well. Part of the collection is rare material, such as the Mar-
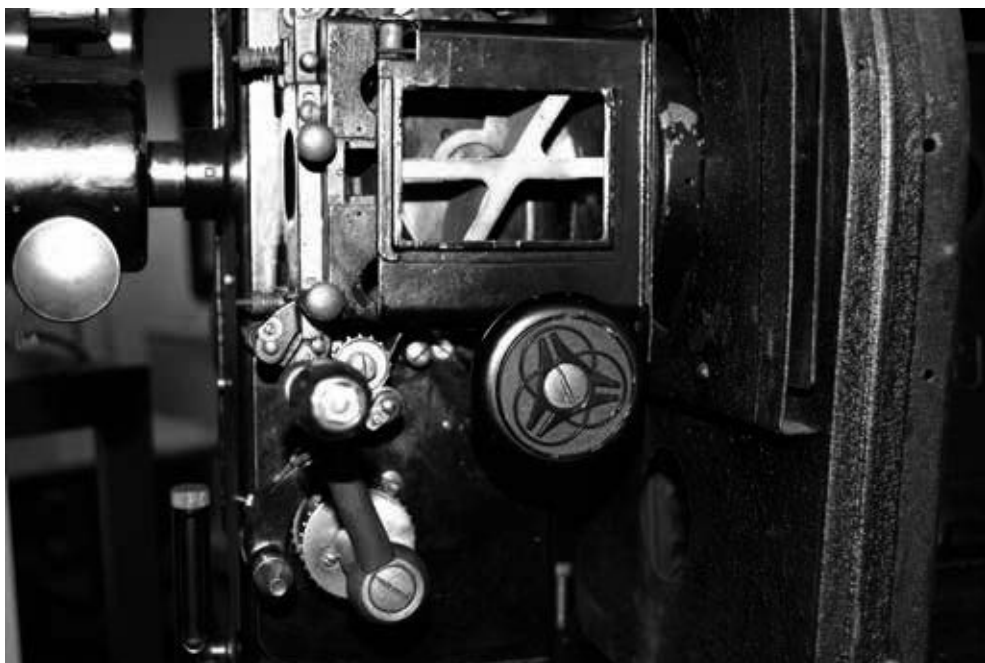
Fig. 1: Details from a Zeiss Ikon 35 mm projector.
Photo by Johan Stadtman, courtesy of the Film Archive,
University of Groningen.

shall plan propaganda films. These films are available for viewing, consulting, and analyzing; the archive contains editing tables and a projection room. There is also a considerable amount of literature available in open access. Furthermore, there is an elaborate and diverse collection of film posters. As impressive as the paper collection is, the collection that really stands out is the collection of apparatuses. The archive has hundreds of cinematic devices such as film and photo cameras and a wide range of film projectors as well as editing tables, one of which belonged to the Dutch filmmaker Bert Haanstra. It now even boasts rare historical film projectors, such as a Zeiss Ikon 35 mm, which was used to explain how the internal mechanisms of film transport worked (see fig. 1).

Also part of the collection are several pre-cinema devices, among them a series of mostly local hand-made magic lanterns, and hand-painted glass plates used for magic lantern projection, some with small hand cranks to make tiny moons magically move from one side of the painted landscape to the other during projection. The archive also contains replicas of pre-cinema devices such as a thaumatrope, a praxinoscoop, and stereoscopic devices developed and used in the 19th century. Moreover, the archive keeps a collection of present-day optical toys which are used in educational practices as

cheap and easily assessable "replicas" of historical devices, view masters, and other simple stereoscopic devices among them.

The collection of film cameras—mostly 8mm, super 8, 9.5mm, and 16mm amateur cameras—originate from different contexts and decades. In addition, there is a subcollection of lenses, among them anamorphic lenses used for widescreen projection. Some of these devices are fully intact and still functioning, like the Bolex H16 Reflex camera (see fig. 2).

Another example of a device which tends to captivate the imagination is the 16mm Bell & Howell Filmo camera once owned by the eminent Dutch filmmaker Joris Ivens, a rather heavy portable camera which was typically used during the Spanish Civil War by documentary filmmakers who wanted to shoot on location (see fig. 3).

More recently, video cameras such as the Portopak and now obsolete television sets have become part of the collection in an attempt to broaden the scope of the archive as a laboratory used for research and educational purposes. Apart from rooms for storage and all sorts of archival work, there is educa-

Fig. 2: The Bolex H16 Reflex camera. Photo by Johan Stadtman, courtesy of the Film Archive, University of Groningen.

Fig. 3: Robert Capa with a 16mm Bell & Howell Filmo camera. The photo was made by Gerda Taro during the Spanish Civil War, May 1937.

tional space in the archive used for screenings, seminars, and staff-assisted hands-on demonstrations and experiments with apparatuses. It is primarily thanks to staff members—the late Johan Stadtman, Jaukje van Wonderen, Bernd Warnders, Erik Buikema, and Tom Slootweg (a contributor to this book), who help to unpack gifts, catalog and photograph objects, and prepare them for exhibition—that apparatus-oriented seminars could be developed as part of the Groningen University curriculum.[82]

EYE

Similar reasons to those discussed above have led the Nederlands Filmmuseum (today EYE) to collect and preserve historical devices since its establishment in 1946. Today, EYE's apparatus collection features approximately 1,300 items, including a number of pre-cinema devices.

It is thanks to the archive's pioneers, such as its first director Jan de Vaal and long-time collection specialist Henk de Smidt, that this collection came to be. In the last couple of decades, EYE's apparatus collection has been cherished and ably taken care of by Soeluh van den Berg, Curator of Film-related Collections and contributor to this book, and film apparatus specialist Hans van de Kraan. They have preserved, restored, and helped define the profile of the apparatus collection.

In terms of policy, it was only in 1957 that the Nederlands Filmmuseum's film-related collections were explicitly referred to in an official policy document.[83] As Van den Berg and Albers discuss in their contribution to this book, EYE's apparatus collection has grown organically throughout the seven decades since the museum was founded, mostly thanks to donations. In 1995, a few general collection criteria were formulated based on the uniqueness, national specificity, or relational nature of the objects to the museum's film collection. It was only in 2004 that EYE's apparatus collection was more critically described and its policy more accurately defined, which resulted in a de-accessioning project during which some redundant items were donated to other archives.[84]

It was only recently that EYE decided to have a more integrated approach to film and film-related collections, looking at films in direct conjunction with relevant other collections and promoting a more active presentation of such related collections. One of the reasons for this change in collection and presentation policy has been the move to the new EYE building, which invites new opportunities to exhibit the collection and engage audiences in other ways. In the new building, EYE organizes film screenings, festivals, and events as well as temporary exhibitions on themes that vary from film histor-

ical subjects—such as *Jean Desmet's Dream Factory, The Adventurous Years of Film (1907–1916)*, *Stanley Kubrick*, and *Fellini*—to art exhibitions exploring the borderline between film and other arts (*Found Footage: Cinema Exposed*, *The Quay Brother's Universum*, and *Expanded Cinema: Isaac Julien, Fiona Tan, Yang Fudong*). Additionally, in the EYE Panorama, aspects of the collection are exhibited making use of interactive installations.

One recent result of the current collection policy adopted by EYE is the permanent exhibition in the museum's basement known as the EYE Panorama,[85] which has since December 2014 been exhibiting a number of film devices from the EYE apparatus collection that mark pivotal moments in the history of film. By means of projections on the wall that showcase the kinds of films these devices used to make (in the case of cameras) or show (in the case of projectors), the Panorama offers new and interactive ways of exhibiting the EYE apparatus collection.[86]

The apparatuses included in the Panorama exhibition are a Magic Lantern with double optical system (Watson & Sons, c. 1880), a Mutoscope device (American Mutoscope and Biograph Company, model DL, nicknamed "The Iron Lion," c. 1900), a Kinamo camera (1924), a 35mm Mitchell camera (Mitchell Camera Corporation, type D, with film magazine, tripod and director's viewfinder, 1935, also known as the "Mitchell Standard"), and, finally, an iPhone 3G (Apple Inc., 2008, the first iPhone equipped with video camera).

From the perspectives of both EYE and the Film Archive at the University of Groningen, we felt the urgency to start an international discussion on film apparatuses, combining the point of view of media scholars and that of media archivists. The symposium, *The Film Archive as a Research Laboratory,*[87] was the

Fig. 4: The EYE Panorama. Photo by Mike Bink, courtesy of EYE.

Fig. 5: The Magic Lantern with double optical system
(Watson & Sons, c. 1880) in the EYE Panorama. Photo by
Mike Bink, courtesy of EYE.

first result of the collaboration between EYE and the Film Archive at the University of Groningen and the starting point of this book and other international ongoing projects. At the symposium, a number of international speakers were invited to reflect on the film apparatus. Among the speakers were Susan Aasman, media historian and amateur film expert; Ian Christie, film historian and former BFI archivist; Andreas Fickers, media historian; Jan Holmberg, head of the Ingmar Bergman Archive in Stockholm; Heide Schlüppman, former head of the university archive at the Goethe University in Frankfurt; Frank Kessler, early cinema scholar and media historian; Sabine Lenk, archivist, scholar, and former director of the Filmmuseum Düsseldorf; Eef Masson, non-theatrical film practices scholar; Roger Odin, film scholar and amateur film specialist; Emile Poppe, archivist at the Cinematek de Bruxelles; and Eric de Kuyper, former adjunct-manager of the Amsterdam Filmmuseum. In retrospect, the symposium was a starting point in many ways, for in the months following, we kept receiving many questions about follow-ups, both from participants and international colleagues. This made us realize that what was needed was a book on the subject. And here we are. In keeping with the general line of the symposium, the book offers reflections on media apparatuses by experts from different perspectives and disciplines and is organized as an archive, that is to say, an archive that functions as a research laboratory.

The contributions in this book focus on various apparatuses, from the pre-cinema to the digital era. Together, they present a crossover of media technologies (film, video, and digital, touching on both image and sound), production phases (recording, post-production, distribution, and projection), and dimensions (2D, 3D, full-immersion). Each contribution is introduced by a full-page photograph of the apparatus under discussion, its technical description, and the theoretical framework in which the apparatus is placed.

PART 3
JUST IMAGINE...

There is a famous conundrum when observing the earth by satellite: the higher the resolution, the less information we have about the location imaged. The extremely high resolution of the *anecdotal method* provides depth and colour to the generalist findings of methods that deal with multiple instances and large-scale tendencies. Anecdotes test such large hypotheses against the unique qualities of artworks and experiences. The anecdotal method does not abandon the project of making statements about larger, more abstract formations like "society" or "cinema"—it grounds them in the specific instance.—Sean Cubitt, 2013.[88]

Just imagine opening the gates to an imaginary vault of a media archive. There you would find heterogeneous objects provisionally stored based on their material aspects. Imagine having gathered a team of 30 international scientists from different disciplines whom you let loose on this collection. Each scientist can choose an object, and he or she can examine it from the perspective of his or her specific discipline and carry out hands-on laboratory research. Scholars will, of course, bring their theoretical perspective to the table, whereas curators and archivists will contribute with their professional curatorial knowledge and experience. Imagine that, based upon close inspection of the object they have chosen to analyze, they are allowed a limited time to carry out their analysis, to expose, to illustrate their findings, and to make their case. The question they have been asked is: Is this object worth preserving, and If so, illustrate what can be said about it that makes it so interesting and relevant for your specific field of research and expertise.

Big Data, Small Data

Here we embrace Cubitt's emphasis that "[t]he anecdotal method does not imply abandoning other tools."[89] In this line, we intend to complement the current, very relevant and important scientific trend of *big data* quantitative research with a thorough, qualitative analysis of the singularity and materiality of media apparatuses that have been kept in the archival vault, which provides research with "depth and color."[90] It also provides a richness of detail without which histories—be it of art, technology, media, or cultures at large, as stories of our own past we can relate to—can barely exist. Furthermore, singularities and details also help to evoke the questions without which good research cannot exist. With Cubitt's views in mind, we set out to make a book that reveals such "depth and color" in the topics discussed by the thirty contributors to this book.

By way of visualizing what it means to provide a depth and richness to the study of an often obsolete object, let us recall the hampering sound and poor visual quality of those small yet expensive TV sets of the late 1950s with tiny screens, encased in precious wood. From oral records, we know these TV sets could keep entire families in awe in front of them, watching the test signal, minutes at a time, in anticipation of the start of the evening program as if they were waiting in the theater for the curtain to rise. In our experience, it is the mental reconstruction of such a situation as well as the material simulation with these objects that may provide researchers with the oral (family) histories, anecdotes, and documents—from family photos to printed user instructions and other *small data*—which are so valuable for the reconstruction of media history in particular, and of history in general, as such simulations help to reconstruct the cultures these objects emblematically represent.

Of course, we also believe, as Cubitt does, that *big data* research is of great importance, as it offers the ideal complementary source of knowledge to the *small data* kind of approach that we present in this project.[91]

Despite the considerable number of contributions to the book, we did not strive for exhaustiveness. Thus you will find in this book no observation of planet apparatuses by satellite (to use Cubitt's conundrum about observing the earth by satellite, "the higher the resolution, the less information we have about the location imaged"). Instead, we chose to avoid a historical or chronological approach to the apparatuses discussed in this book as well as any form of teleological approach. We chose not to limit the scope of the book by addressing only one specific audio-visual medium; instead we opted to include pre-cinema, video, film, and digital technologies. We also preferred to use an open and explorative attitude towards the selection of the apparatuses and the theoretical framing of each apparatus. We based these choices on the

idea of the archive as a research laboratory, and of course we were inspired by the apparatus collections held at the Film Archive in Groningen and at EYE. As mentioned earlier, both collections, like many apparatus collections held by other archives and museums, have a random and at times pragmatically driven background.

It should be noted that we deliberately chose not to use a single research practice or a single theoretical framework for this book, as we felt that it would go against the ambition of opening up the field for further experimental research. Indeed, we recognize that theories are reassessed in the light of new realities and that archival realities are very much in transition at this point in time, as are their conceptualizations. Therefore, we find that an investigative and explorative flexible approach to apparatuses is most suited for this transitional phase of archival practice and related hands-on research.

The format and order of succession of the essays collected in this volume represents what we thought would be the closest realization of an object-driven, hands-on, experimental laboratory in book form. We have chosen the object's size to designate its place in the general order of the book, from the smallest to the largest, labeling them as small, middle-sized, or large. In this classification, the main aspect of the apparatuses that we wanted to highlight is that of its transportability. All objects that are small enough to be carried around and that are in fact made to do so fall into the category "small." Those that are not meant to be carried around regularly but can be transported when needed are collected under the label "medium." Finally, all other apparatuses, some of which cannot be even contained in an archival vault because of their shape or size, are labeled "large." Again, we are opening the gate to an imaginary archival vault where apparatuses have been provisionally stored; therefore our organizational criteria are merely practical and fundamentally random.

HOW TO USE THIS BOOK

Apparatuses and Approaches Included in This Book

The different approaches in this book correspond—not systematically but in a random or symptomatic way—with the sampling of perspectives on film study and on film archival practice, including academic research practice or active adjacent and overlapping practices.

Some film archivists and curators have chosen some of the apparatuses from their everyday practice, as they felt they needed to reposition them within the archive and reconceptualize them in the discourse on media studies.

Some scholars have chosen apparatuses that already have an important place in their specific field of research or should gain such a place in the near future. Following our organizing principle, from small to large, we have collected the contributions to this book as follows.

Small and Portable

Film theorist Roger Odin's chapter opens the section on small portable devices with today's ubiquitous smartphone. Odin addresses the question why the smartphone belongs in the film archive by arguing that this new device has changed our relationship to cinema in radical ways.

Film and visual media scholar Martine Beugnet combines an analysis of a smartphone—a contemporary iPhone, to be specific—with that of an early 1900 Debrie Parvo camera. Beugnet analyzes the two apparatuses as they are portrayed in the award-winning film Untitled by Daniel Szöllösi's, created as part of the 2012 "celluloid remix" online competition.

Film archivist, researcher, and projectionist Leenke Ripmeester focuses on the 35mm film. Although the vast majority of films held by archives all over the world was shot on and projected as 35mm film, it is rarely discussed as an apparatus. Ripmeester looks at 35mm film reels by taking into account the perspective of the projectionist.

Film producer and lecturer Marek Jancovic looks at the hand-cranked projector. He analyzes the variable frame rates in hand-cranked projection practice in contrast with the later standardization of frame-rates projection and contemporary norms for digital cinema, television, and streaming video.

Film researcher Guy Edmonds draws from his experience as a filmmaker to define a hands-on method of exploring the functionality of the compact 16mm Movie Maker camera. By interpreting the films made with this camera, Edmonds discusses the effects of technology on aesthetical results.

Media theorist William Uricchio analyzes the film-apparatus catalog section of one of the largest American department stores in the late 1800s, *Sears, Roebuck & Co.* Using the 1898 *Sears Consumers Guide*, Uricchio looks at the exhaustive section dedicated to film apparatuses just a few years after the introduction of the medium, and discusses how the catalog helps us understand the expectations of millions of readers toward the new medium.

Film researcher Steven Willemsen discusses the prismatic Hilux 264 lens, a fixed anamorphic lens for widescreen projection, which is currently stored at the University of Groningen Film Archive. Willemsen examines how anamorphic widescreen technology impacted film aesthetics in the late 1950s, focusing on the technology's affordances and limitations. Furthermore, Wil-

lemsen argues that Sergio Leone introduced a new close-up aesthetics to the widescreen in the 1960s, in a dynamic relation with mainstream television aesthetics.

Media historian Susan Aasman focuses on amateur filmmaking and on the role of the Ciné-Kodak system introduced by the Eastman Kodak Company in 1923 for amateur use. Aasman aims to re-evaluate Kodak's role in shaping everyday life and, consequently, reassesses its position in the history of amateur media.

Film researcher Annelies van Noortwijk addresses the Orbit apparatus, a newly invented portable camera stabilization system, suitable for cameras with different film formats. Van Noortwijk explores in detail this unique apparatus, developed and patented in 2014 to meet the needs of independent filmmaker Leonard Retel Helmrich to help him realize his "Single Shot Cinema" style.

Media researcher Ari Purnama analyzes the optical video compact disc (VCD), introduced by Sony and Philips in 1993. Purnama discusses how this small apparatus, which has dominated the Asian market in the 1990s, has played a huge role in the (illegal) distribution of international films in Southeast Asia.

Film and television scholar Barbara Turquier approaches the Bolex camera, originally produced in 1928, by focusing on the camera's crucial role in post-WWII American avant-garde cinema up until the 1970s. Turquier discusses the interplay between amateurism and professionalism in the avant-garde-style filmmaking produced with this very popular portable camera.

Media archaeology scholar Alexandra Schneider opted for an apparatus everybody is familiar with but which has rarely been discussed: the tripod. Schneider focuses on the Kino-Pano-Tilt-Tripod for 16mm movie cameras, which gives her the opportunity to approach the history of amateur filmmaking as a history of material objects and devices that can be interpreted as an archaeology of the amateur digital video.

Media historian Tom Slootweg discusses Sony's Video Rover Ensemble, also known as the First Consumer Portapak, which triggered a state of euphoria at its moment of introduction. Slootweg argues that the Portapak video system in the late 1960s and early 1970s had the potential to be used for educational purposes and guerrilla journalism.

The last of our portable apparatuses is the Edison Ideal kinematograph, analyzed by film scholar Gert Jan Harkema and visual media expert Amanda du Preez. They argue that any discussion of this apparatus, with which Christiaan Slieker set up his Grand Théatre Edison attraction across fairgrounds in the Netherlands from 1896 to 1907, should take the interaction with the audience into account.

Medium and Not Easily Portable

Film scholar Eef Masson discusses the 16mm projector and its educational use. Masson addresses the "Specto 500" Cine Projector, released by the British company Specto Limited in 1951. She promotes the notion of the *dispositif* to analyze screening conditions and actual viewing practices in the research on classroom films.

A different 16mm projector forms the focus of digital-heritage scholar Julia Noordegraaf's essay, namely the EIKI 16mm Film Projector used by film artist Marijke van Warmerdam for her film installations. Noordegraaf discusses the consequences for Van Warmerdam's work when the 16mm projector was replaced altogether by a digital projector.

Film technology expert Benoît Turquety chooses a specific Kinemacolor projector held in the Will Day collection at the Cinémathèque Française. Turquety adopts an archaeological and epistemological approach to discuss Charles Urban's Kinemacolor projector. Through a precise technological description of this apparatus, he aims to reveal the technical, economical, aesthetic, and political aspects of Charles Urban's activity.

Film historian and early color specialist Joshua Yumibe analyzes an early post-production apparatus: the Pathé Frères' stencil-cutting machine dated from around 1909. Yumibe looks at the technical history of film stenciling from a media-archeological perspective, focusing on aspects of hybridization typical of stencil-colored images that combine mechanical, manual, photographic, and animation techniques.

Film scholar and early sound specialist Sonia Campanini focuses on the Biophon system, an early sound system displayed at the Deutsches Museum in Munich. The Biophon system consists of two apparatuses: the film projector Panzerkino and the gramophone Biophon. Campanini relies on concepts such as device, *dispositif*, and system to discuss the characteristics of recorded sound-on-disc for film exhibitions, including the performative dimension of exhibitions in her analysis.

Film historian Ian Christie addresses the widely used DLP Digital Cinema Projector, equipped with a Texas Instruments 1.2 inch 2K 3-chip DMD DLP chip. Focusing on the 2K resolution this projector can provide, Christie argues that the combination of such resolution with the potential of 3D has been essential to the replacement of the 35mm film projection standard, a true technical revolution worthy of academic reflection.

Large and Not Portable

Film curator Martin Koerber has chosen a kind of apparatus that has seldomly been studied and written about: the film post-production equipment. Koerber looks at the Geyer "Rekord" printing machine, a continuous contact printer for 35mm film produced in the 1930s. Koerber argues that, with the demise of celluloid film in the current film production and distribution and with the sudden disappearance of film laboratories, the "Rekord" is at risk of disappearing at this point in time if its importance is not argued by archivists and researchers.

Focusing on Jean-Luc Godard's Steenbeck editing table installed in his home in Rolle, France, film scholar and Godard specialist Céline Scemama demonstrates how the fictional and archival material in Godard's HISTOIRE(S) DU CINÉMA (1988-1998) has been processed to reflect the filmmaker's specific conception of history through images.

Archive curator and film researcher Jan Holmberg focuses on the close-up and, more specifically, on the debate on closer framings on bigger screens as discussed in the international film-trade press between 1908 and 1912. Holmberg argues that the close-up was already used in earlier cinema but became a dominant stylistic device only after 1908.

Film historian Frank Kessler and film curator and archival researcher Sabine Lenk look at the recent conversion of cinemas to digital projection (the so-called *digital roll-out*) by addressing the question to what extent the cinematic *dispositif* is actually affected by the shift from celluloid to digital.

In his discussion of 3D-imaging technology, film scholar Miklós Kiss retraces the cinematic history of stereoscopy, from Charles Wheatcroft's 1838 stereoscope to the current debate on 3D technology. At the heart of Kiss's analysis lies the question whether the 3D revolution will happen. Kiss, however, does not exclusively focus on the well-known debate but also explores the affordances of the new 3D technologies for narrative cinema audiences.

Media researcher and curator Caylin Smith discusses the EYE 360° Panorama based on her first-hand experience working directly with this apparatus. Comparing the 360° Panorama with installations such as Gustav Deutsch's FILM IST, Smith analyzes the 360° apparatus as the instrument through which EYE explores new ways of exhibiting its collection.

Film curators Rommy Albers and Soeluh van den Berg chose to discuss the relational database, specifically the Collection Management System Collection EYE. A crucial apparatus in today's archival practice as well as in research projects, the database has a history that will influence any research based on the information they contain, as Albers and Van den Berg very clearly demonstrate using the apparatus collection as example.

Movie theater setups are rarely conserved and exhibited in film archives. Film scholar Julian Hanich discusses the Invisible Cinema, the movie theater designed by experimental filmmaker Peter Kubelka and realized in the early 1970s at the Anthology Film Archives in New York and at the Austrian Film Museum. Hanich discusses the aims of the Invisible Cinema's interior design as envisioned by Kubelka, and presents a phenomenological reception study of the specific viewing experiences it offers.

The last contribution to the book is from media theorist Nanna Verhoeff, who presents the largest and least portable apparatus discussed: the augmented reality (AR) installation, which comprises an entire city square. Augmented reality is a digital technology that allows users to add layers of (visual) information to the actual location they are looking at. Verhoeff focuses on so-called AR browsers for outdoor navigation (developed since 2009) and discusses them as mobile archival laboratories where experimentation is carried out in order to make cultural collections accessible on location.

NOTES

INTRODUCTION

1   Rudolf Arnheim, "The Coming and Going of Images" [Editorial], *Leonardo* 33, no. 3 (2000): 167-168.

2   See "Philosophy of Technology," *Stanford Encyclopedia of Philosophy*, last modified June 22, 2009, http://plato.stanford.edu/entries/technology/.

3   On "cinema" as a young practice and a young institution, see André Gaudreault, "From 'Primitive Cinema' to 'Kine-Attractography,'" in *The Cinema of Attractions Reloaded*, ed. Wanda Strauven (Amsterdam: Amsterdam University Press, 2006), 99.

4   For an overview, see Benoît Turquety, "Toward an Archaeology of the Cinema/ Technology Relation: From Mechanization to 'Digital Cinema,'" in *Technē/Technology: Researching Cinema and Media Technologies – Their Development, Use, and Impact*, ed. Annie van den Oever (Amsterdam: Amsterdam University Press, 2014), 50-64.

5   Erkki Huhtamo, "Towards a History of Peep Practice," in *A Companion to Early Cinema*, eds. André Gaudreault et al. (Chichester: Wiley, 2012), and Erkki Huhtamo and Jussi Parikka, eds. *Media Archaeology: Approaches, Applications, and Implications* (Berkeley, CA: University of California Press, 2011).

6   For a quick introduction to Cavell, see the concise overview presented in the conversation online already referred to here: "Conversations with History," Institute of International Studies, UC Berkeley, February 7, 2002, http://globetrotter. berkeley.edu/people2/Cavell/cavell-con0.html.

7   Jean-Louis Baudry, "Le dispositif: approches métapsychologiques de límpression de la réalité," *Communications* 23, no 23 (1975): 56-72, http://www.persee.fr/web/ revues/home/prescript/article/comm_0588-8018_1975_num_23_1_1348.

8   For recent discussions of the apparatus theory and its specific context and impact, see the review by Trond Lundemo of the conference, "The Impact of Technological Innovations on the Historiography and Theory of Cinema," held at La Cinémathèque québécoise, Montreal, November 1-6, 2011: Trond Lundemo, "Lost in Translation? On the Diverging Responses to the Question Concerning Technology," *NECSUS* (2011), http://www.necsus-ejms.org/the-impact-of-technological-innovations-on-the-historiography-and-theory-of-cinema-la-cinematheque-quebecoise-montreal-1-6-november-2011. See also the dialogue on Metz between Metz's biographer Martin Lefebvre and Annie van den Oever: "Revisiting Christian Metz's 'Apparatus Theory' – A Dialogue," in *Technē/Technology*, 240-257, and the "triologue" between Laura Mulvey, Anna Backman Rogers, and Annie van den Oever discussing the impact on feminist film studies: "Feminist Film Studies 40 Years After 'Visual Pleasure and Narrative Cinema,' a Triologue," *NECSUS* (June 10, 2015), http://www.necsus-ejms.org/feminist-film-studies-40-years-after-visual-pleasure-and-narrative-cinema-a-triologue/. For an overall discussion of the dispositif, see Frank Kessler, "The Cinema of Attractions as *Dispositif*," in *The Cinema of Attractions Reloaded*, 57-69, available online in OAPEN: www.oapen.org/download?type=document&docid=340138.

9   Paul Valéry, "La conquête de l'ubiquité," published for the first time in *De la musique avant toute chose (textes de Paul Valéry, Henri Massis, Camille Bellaigue, etc.)* (Paris: Editions du Tambourinaire, 1928).

10 Walter Benjamin, "The Work of Art in the Age of Its Technical Reproducibility: Third Version," in *Selected Writings, Volume 4: 1938-1940*, eds. Howard Eiland and Michael W. Jennings (Cambridge, MA: Harvard University Press, 2003), 251-283.

11 Marshall McLuhan, *Understanding Media: The Extensions of Man* (Cambridge, MA: MIT Press, 1994).

12 For an introduction to the topic, see Geoffrey Winthrop-Young and Annie van den Oever, "Rethinking the Materiality of Technical Media: Friedrich Kittler, *Enfant Terrible* with a Rejuvenating Effect on Parental Discipline – A Dialogue," in *Technē/Technology*, 219-239.

13 Bernard Stiegler's, *Technics and Time 1: The Fault of Epimetheus*, trans. Stephen Barker (Stanford, CA: Stanford University Press, 1994), and *Technics and Time 2: Disorientation*, trans. Stephen Barker (Stanford, CA: Stanford University Press, 2008), and his "An Organology of Dreams," trans. Daniel Ross, *Screening the Past* 36 (2013): paragraph 18.

14 Paul Virilio, *War and Cinema: The Logistics of Perception* (London: Verso, 1989).

15 See Annie van den Oever, ed., *Technē/Technology: Researching Cinema and Media Technologies – Their Development, Use, and Impact. The Key Debates*, vol. 4 (Amsterdam: Amsterdam University Press, 2014).

16   This paper was presented at the conference "Methods, Machines, Dispositives: Perspectives for a New Technological History of the Cinema," organized by Benoît Turquety and Selim Krichane at the University of Lausanne in November 2012. A reworked and extended version was published as a chapter in *Technē/Technology* in 2014 under the title "Toward an Archaeology of the Cinema/Technology Relation: From Mechanization to 'Digital Cinema.'" See also: Benoît Turquety, *Inventer le Cinéma. Épistémologie: Problèmes, Machines* (Lausanne: Editions L'Âge d'Homme, 2014).

17   Turquety, "Toward an Archaeology of the Cinema," 50.

18   *Ibid.*

19   *Ibid.*

20   *Ibid.*, 50-51.

21   *Ibid.* Cinema is the term used for the institution, including the "apparatus," whereas film is used mostly in a more restricted way, referring to the technologies used in the cinema as a place and an institution. However, for reasons of variation, sometimes the terms are used simply as synonyms, here as well as in many other studies.

22   Turquety, "Toward an Archaeology of the Cinema," 51.

23   See the 2009 Udine conference on this topic organized by Francesco Casetti, Jane Gaines, Valentina Re, and others, and the accompanying book: *Dall'inizio, alla fine. Teorie del cinema in prospettiva / In the Very Beginning, at the Very End. Film Theories in Perspective*, eds. Francesco Casetti, Jane Gaines, Valentina Re (Udine: Forum, 2009).

24   For a study on the transition from analog to digital, see also Giovanna Fossati, *From Grain to Pixel: The Archival Life of Film in Transition* (Amsterdam: Amsterdam University Press, 2009).

25   See the "death of the cinema" debate as discussed by André Gaudreault, who has long been working on a so-called New Film History. See André Gaudreault, "The Future History of a Vanishing Medium," in *Technē/Technology*, 261-271. See also Paolo Cherchi Usai, *The Death of Cinema. History, Cultural Memory and the Digital Dark Age* (London: British Film Institute, 2001), and André Gaudreault and Philippe Marion, *The End of Cinema? A Medium in Crisis in the Digital Age*, trans. Timothy Barnard (New York, NY: Columbia University Press, 2015).

26   See the discussion of changing archiving policies in relation to the debate on film's ontology with the shift to digital in Fossati, *From Grain to Pixel,* 16-22.

27   For a further reflection on the etymology of the word, see the chapter on Heidegger by Robert Sinnerbrink: "Technē and Poiēsis: On Heidegger and Film Theory," in *Technē/Technology*, 65-80; see also the Stanford Encyclopedia of Philosophy online: http://plato. stanford.edu/entries/technology/; and in particular "Heidegger's Aesthetics," *Stanford Encyclopedia of Philosophy*, last modified May 10, 2011, http://plato.stanford.edu/entries/heidegger-aesthetics.

28 See Leo Marx, "Technology: The Emergence of a Hazardous Concept," *Technology and Culture* 51, no. 3 (July 2010): 562.

29 For a full overview, see Turquety, "Toward an Archaeology of the Cinema/Technology Relation, 52-53.

30 *Ibid.*

31 *Ibid.*

32 Rick Altman, "Toward a Theory of the History of Representational Technologies," *Iris* 2, no. 2 (1984): 115. Altman also points out that "technology often automatizes an accepted technique." The reflections on the procedures of use by engineers often invite new technologies.

33 Convincing examples from the field of TV are provided by the ADAPT project supervised by John Ellis: http://www.academia.edu/2408345/ADAPT_outline_research_project_on_technology_in_TV. Annie van den Oever, "From Technology to Medium," in *Dall'inizio, alla fine. Teorie del cinema in prospettiva / In the Very Beginning, at the Very End. Film Theories in Perspective*, eds. Francesco Casetti, Jane Gaines, Valentina Re (Udine: Forum, 2009).

34 See Altman, "Toward a Theory of the History of Representational Technologies."

35 See Annie van den Oever, "Introduction: Researching Cinema and Media Technologies," in *Technē/Technology*, 15-16.

36 N.N., "Het succes van de Kinematograaf," *Suriname: koloniaal nieuws- en advertentieblad*, February 25, 1898, http://kranten.kb.nl/view/article/id/ddd%3A010340255%3Ampeg21%3Ap003%3Aa0017. Here we draw from Van den Oever, "Introduction: Researching Cinema and Media Technologies," 15-16.

37 As the journalist broadly refers to an anthology of terms published in the (German) journal *Laterna Magica*, it seems most likely that the list of terms cited is taken from this issue: *Laterna Magica* 21, no. 50 (April 1897): 25. See Van den Oever, *Technē/Technology*, 15-16.

38 On the notion of "format," see Jonathan Sterne, *MP3. The Meaning of a Format* (London: Duke University Press, 2012), 7. We agree with Jonathan Sterne that the concept of format is essential in understanding media: "Format denotes a whole range of decisions that affect the look, feel, experience, and workings of a medium. It also names a set of rules according to which a technology can operate" (p. 7). It seems to us that the move from mere technological device to formatted medium is made in often carefully recorded steps and, moreover, that technical amendments to facilitate medium use and discursive framing to direct the user's experience are pivotal steps in developing and supporting new user practices.

39 Obviously, unifying the terms in the book is not an option. For a clarification of how we deal with this topic in this book, see the introduction.

40 C.W. Ceram, *Archaeology of Cinema*, trans. Richard Winston (London: Thames & Hudson, 1965), 16.

41 *Ibid.*, 17.

42 Erkki Huhtamo, "From Kaleidoscomaniac to Cybernerd: Notes toward an Archae-ology of the Media," *Leonardo* 30, no. 3 (1997): 221-224. Stable URL in Jstor: http://www.jstor.org/stable/1576453 (January 2015).

43 See Huhtamo, "From Kaleidoscomaniac to Cybernerd," and his more recent book, *Media Archaeology Approaches, Applications, and Implications.* For an over-view of the field of media archaeology, see Wanda Strauven in this book.

44 See Huhtamo's conclusion in "From Kaleidoscomaniac to Cybernerd."

45 Arnheim cited on *Leonardo On-Line*, see: "LEONARDO/ISAST CALL FOR PAPERS: Refresh! First International Conference on the Histories of Media Art, Science and Technology," Leonardo On-Line (December 1, 2004), accessed in the spring of 2015, http://www.leonardo.info/isast/journal/calls/arthistory_refreshcall2004.html [my italics].

46 Famous and often quoted are Maxim Gorky's words on the limitations of the new machine, eagerly and effectively exploited in the early film shows. See Maxim Gorky, "Last Night I Was in the Kingdom of Shadows," in *The Kingdom of Shadows*, eds. Colin Harding and Simon Popple (London: Cygnus Arts, 1996), 5-11.

47 These essays were in part published in his now classic, *Film als Kunst* [Film as Art], in 1932: Rudolf Arnheim, *Film as Art* (London: Faber, 1969).

48 See the 2001 interview with Arnheim on *Leonardo On-Line*: "My interest in film originated with an interest in the expressive capabilities of the visual. For this, film offered a wealth of new examples. I was occupied with the question of how one could represent the world through a moving image, which is, however, *limited by the screen*. This very limitation allowed me to conclude that film can never be a simple reproduction of reality. On the contrary, filmic images have the ability to shape reality and produce meaning. Film interprets the visible world through authentic phenomena from this world and *thus takes hold of experience*. Film is not a direct representation in contrast to the indirectness of art; rather, it is a form of artistic expression" [my italics].

49 Gorky, "Last Night I Was in the Kingdom of Shadows."

50 For an analysis of the artistic practices responding to the early film shows, see Yuri Tsivian, *Early Cinema in Russia and Its Cultural Reception*, trans. A. Bodger, ed. R. Taylor (London: Routledge, 1994); see also Annie van den Oever, "Ostranenie, 'The Montage of Attractions' and Early Cinema's 'Properly Irreduc-ible Alien Quality,'" in *Ostrannenie. On "Strangeness" and the Moving Image. The History, Reception, and Relevance of a Concept. The Key Debates*, vol. 1 (Amsterdam: Amsterdam University Press, 2010), 33-58.

51 See Tom Gunning, "The Cinema of Attractions. Early Film, Its Spectator and the Avant-Garde," in *Early Cinema. Space, Frame, Narrative*, ed. Thomas Elsaesser (London: British Film Institute, 1990); and his "An Aesthetic of Astonishment: Early Film and the (In)credulous Spectator," in *Viewing Positions. Ways of Seeing Film*, ed. Linda Williams (New Brunswick, NJ: Rutgers University Press, 1994).

52 See Van den Oever, "Ostranenie, 'The Montage of Attractions.'"

53 See Julia Noordegraaf et al., eds. *Preserving and Exhibiting Media Art: Challenges and Perspectives* (Amsterdam: Amsterdam University Press, 2013).

54 Viktor Shklovsky, in "Art as Technique," provided the conceptual tools to describe and analyze the process of appropriation of new techniques in culture, and he brought to light the fact that the genealogies of art and technique are intertwined because they are inherently connected. "The notion of 'technique' creates a conceptual space to analyze the effects of both hardware and software, of technology and (artistic) techniques. This is exactly what makes the term productive and suitable for studies in the field of the arts and media, in which technology profoundly interferes with the creation and development of the arts…" Cited from Van den Oever, *Ostrannenie*, 56.

55 "The history of art is, at least in part, a history of the tools and materials with which art is made." See for more information the Daniel Langlois Foundation (Canada) and its online DOCAM research initiative, which explains having been concerned with the relationship between technological invention and artistic creation "from the beginning." See http://www.docam.ca/en/technological-time-line.html. Cited from *Ostrannenie*, 215.

56 Arnheim, *Leonardo On-Line*, 2000.

57 Paul Valéry, "La Conquète de l'ubiquité," in *Aesthetics*, trans. Ralph Manheim (New York, NY: Pantheon Books, Bollingen Series, 1964), 225.

58 *Ibid.* Also quoted in Walter Benjamin, "The Work of Art in the Age of Mechanical Reproduction" [1936], in *Illuminations*, ed. Hannah Arendt (London: Fontana, 1968), 217. See also, Paul Valéry, PIÈCES SUR L 'ART, "La Conquète de l'ubiquité" (inaugural lecture at the *Collège de France* in Paris, France, 1945). For the complete text, see Paul Valéry, "La conquête de l'ubiquité" [1928], in *Oeuvres*, *Pièces sur l'art*, vol. 2 (Paris: Gallimard, Bibl. de la Pléiade, 1960), 1283-1287, http://classiques.uqac.ca/classiques/Valery_paul/conquete_ubiguite/valery_conquete_ubiquite.pdf. See also Walter Benjamin, "The Work of Art in the Age of Mechanical Reproduction" [1936], http://www.udel.edu/History/suisman/611_S05_webpage/benjamin-work-of-art.pdf, or http://isites.harvard.edu/fs/docs/icb.topic235120.files/BenjaminWorkArt.pdf. For a recent reflection on Benjamin and Technology, see Dominique Chateau, "The Philosophy of Technology in the Frame of Film Theory: Walter Benjamin's Contribution," in *Technē/Technology*, 29-49.

59 Tom Gunning, "Re-Newing Old Technologies: Astonishment, Second Nature, and the Uncanny in Technology from the Previous Turn-of-the-Century," in *Rethinking Media Change: The Aesthetics of Transition,* eds. David Thourburn and Henry Jenkins (Cambridge, MA: MIT Press, 2003), 39-60.

60 On the materiality of the medium, see Lisa Gitelman, *Always Already New. Media, History and the Data of Culture* (Cambridge, MA: MIT Press, 2008), discussed by Susan Aasman in this book.

61 See online The Film Archive as a Research Lab: http://filmarchief.ub.rug.nl/root/Nieuws/Nieuwsarchief/Symposium/.

62 See Andreas Fickers and Van den Oever, "Experimental Media Archaeology: A Plea for New Directions," in *Technē/Technology*, 272-278.

63 For an elaborate discussion of these objectives and such new practices, see Fossati, *From Grain to Pixel.*

64 See Jacques Derrida and Eric Prenowitz, "Archive Fever. Archive Fever: A Freudian Impression," *Diacritics* 25, no. 2 (Summer 1995): 9-63, http://www.jstor.org/stable/465144. See also the PDF online: http://newsgrist.typepad.com/files/derrida-archive_fever_a_freudian_impression.pdf.

65 William Uricchio, "Archives and Absences," *Film History* 7, no. 3 (Fall 1995): 256-263. In regard to the historical filtration of evidence, Uricchio writes that it is "[..] a process by which the archival selection criteria determined by a period's dominant social formations shape and de-limit our access to the past" (p. 260).

66 For an example of selection criteria in a science museum, see the Collecting Strategy Document (2011) of the earlier mentioned Science Museum in London, accessed July 8, 2015, http://www.sciencemuseum.org.uk/about_us/smg/corporate/˜/media/827CCBE7834744EB84C0FEE3780A7B60.pdf.

67 For a historical overview of collection policies and practices, see Sharon Macdonald, "Collecting Practices," in *A Companion to Museum Studies*, ed. Sharon Macdonald (Malden, MA and Oxford: Blackwell Publishing, 2011), 81-97.

68 An exception to the rule was certainly Barry Salt's *Film Style and Technology: History and Analysis* (London: Starword, 1983); and, more recently, Leo Enticknap's, 2005 book, with a special concern for film archival matters: *Moving Image Technology: From Zoetroop to Digital* (London: Wallflower, 2005). As a reference book, Ira Koningsberg's *The Complete Film Dictionary* (New York, NY: Penguin, 1997) is also worth mentioning.

69 Thomas Elsaesser, "The New Film History," *Sight & Sound* 55, no. 4 (Fall 1986): 246.

70 Regarding the effects of the Brighton Conference see, among others, Thomas Elsaesser, *Early Cinema. Space Frame Narrative* (London: British Film Institute, 1990) and his "The New Film History," 246-251; Frank Kessler, "Het geheugen van de cinema," in *Lang leve de film!*, ed. Dick Smits (Nijmegen: Vrienden van het Filmarchief, 1995), 25-30; William Uricchio, "Historicizing Media in Transition," in *Rethinking Media Change: The Aesthetics of Transition,* eds David Thorburn and Henry Jenkins (Cambridge, MA: MIT Press, 2003), 23-38; Charles Musser, "Historiographic Method and the Study of Early Cinema," *Cinema Journal* 1 (2004): 101-107.

71 For a recent discussion on the changes in film scholarship after the 1970s, see André Gaudreault, *Film and Attraction: From Kinematography to Cinema*, trans. Timothy Barnard (Urbana, IL: University of Illinois Press, 2011), 207. Orig-

inally published as *Cinéma et attraction: Pour une nouvelle histoire du cinématographe* (Paris: CNRS Editions, 2008); André Gaudreault, "From 'Primitive Cinema' to 'Kine-Attractography,'" in *The Cinema of Attractions Reloaded*, 99. See also Gaudreault's influential, older article, written with Tom Gunning: "Early Cinema as a Challenge to Film History" which is reprinted in the same 2006 book. The book is available online in OAPEN.

72 Joshua Yumibe's book review: "Film and Attraction: From Kinematography to Cinema," *Screen* 53, no. 4 (Winter 2012): 480-483.

73 There is a growing corpus of literature on film archival practice and theory. See, for instance, Paolo Cherchi Usai, ed., "Film da salvare: guida al restauro e alla conservazione," *Comunicazione di Massa* 3 (1985) and his *Silent Cinema. An Introduction* (London: British Film Institute, 2000); Michele Canosa, ed. "La tradizione del film. Testo, filologia, restauro," *Cinema & Cinema* 63 (1992): 21-47; Penelope Houston. *The Keepers of the Frame. The Film Archives* (London: British Film Institute, 1994); Gianluca Farinelli and Nicola Mazzanti, *Il cinema ritrovato. Teoria e metodologia del restauro cinematografico* (Bologna: Grafis Edizioni, 1994); Ray Edmondson, *A Philosophy of Audiovisual Archiving* (Paris: UNESCO, 1998), http://unesdoc.unesco.org/images/0011/001131/113127eo.pdf, and his *Audiovisual Archiving: Philosophy and Principles* (Paris: UNESCO, 2004), http://unesdoc.unesco.org/images/0013/001364/136477e.pdf; Paul Read and Mark-Paul Meyer, eds. *Restoration of Motion Picture Film* (Newton, MA: Butterworth-Heinemann, 2000); Karen F. Gracy, *Film Preservation: Competing Definitions of Value, Use, and Practice* (Chicago, IL: The Society of American Archivists, 2007); Fossati, *From Grain to Pixel,* 2009 and 2011; Giulio Bursi and Simone Venturini, eds., *Quel che brucia (non) ritorna – What Burns (Never) Returns: Lost and Found Films* (Udine: Campanotto Editore, 2011); Caroline Frick, *Saving Cinema: The Politics of Preservation* (New York, IL: Oxford University Press, 2011); Barbara Flueckinger, "Material Properties of Historical Film in the Digital Age," *NECSUS. European Journal of Media Studies* (Fall 2012), http://www.necsus-ejms.org/material-properties-of-historical-film-in-the-digital-age/; Leo Enticknap, *Film Restoration. The Culture and Science of Audiovisual Heritage* (New York, NY: Palgrave and Macmillian, 2013). The studies listed here focus indeed mainly on films. When these studies refer to film-related collections, it is typically as a source of contextual information for researching and understanding films.

74 Elisabeth Edwards and J. Hart, eds., "Introduction: Photographs as Object," in *Photographs, Objects, Histories: On the Materiality of Images* (London: Routledge, 2004), 3.

75 William T. Mitchell, *What Do Pictures Want? The Lives and Loves of Images* (Chicago, IL: University of Chicago Press, 2004), 149.

76 Erika Balsom, "Original Copies: How Film and Video Became Art Objects," *Cinema Journal* 53, no. 1 (Fall 2013): 109.

77 Fossati, *From Grain to Pixel.*

78 On Media Archaeology as a practice and/or discipline, see Wanda Strauven's over-view, "The Observer's Dilemma: To Touch or Not to Touch," in *Media Archaeology: Archaeology: Approaches, Applications, and Implications*, 148-163, and her "Media Archaeology: Where Film Studies, Media Art and New Media (Can) Meet," in *Preserving and Exhibiting Media Art: Challenges and Perspectives*, eds. Julia Noorde-graaf et al. (Amsterdam: Amsterdam University Press, 2013), 59-79.

79 See also the media archaeological approach in this book presented by Alexandra Schneider reflecting on the tripod. Founding father Friedrich Kittler's approach to the archaeology of media famously led to media archaeology research, hands-on, at Humboldt University from which it was disseminated to other universities in Germany, Austria, Switzerland, the USA, and the Netherlands. For a discussion of Kittler's impact on the field of film, see also: Winthrop-Young and Van den Oever, "Rethinking the Materiality of Technical Media."

80 The Film Archive obtained its collection through a donation of the "Stichting Vrienden van het Filmarchief van Nijmegen" (Foundation for Friends of the film archive at the University of Nijmegen). See http://filmarchief.ub.rug.nl/root/Het-Filmarchief/.

81 To consult the homepage of The Film Archive Groningen go to: http://filmarchief.ub.rug.nl/root/HetFilmarchief/.

82 See http://filmarchief.ub.rug.nl/root/HetFilmarchief/exhibition.

83 Soeluh van den Berg, "Filmgerelateerde Collecties: De nalatenschap van Jean Desmet" (forthcoming) and Jan de Vaal, *Richtlijnen voor de ontwikkeling van het Nederlands Filmmuseum* [Policy Document] (Amsterdam: EYE Archive, 1957).

84 See the contribution by Soeluh van den Berg and Rommy Albers in this book and the EYE blog, soon to be part of the EYEFILM.NL portal, http://filmgerelateerde-collecties.blogspot.nl/p/apparaten.html.

85 See the EYE Collection Policy 2014-2017, https://www.eyefilm.nl/en/file/22260/download.

86 The new Panorama exhibition has been curated by Ynte Alkema, Marente Bloem-heuvel, and Irene Haan and realized by Studio Louter. The Panorama has been made possible thanks to the financial support of the BankGiroLoterij and the Jovaro Foundation. See https://www.eyefilm.nl/en/visit/plan-your-visit/activities/panorama.

87 See online: http://filmarchief.ub.rug.nl/root/HetFilmarchief/symposium.

88 See Sean Cubitt, "Anedoctal Evidence," *NECSUS* (Spring 2013), http://www.necsus-ejms.org/anecdotal-evidence/) [my italics].

89 *Ibid.*

90 *Ibid.*

91 For a discussion of the challenges of *big data* approaches to film archival collec-tions, see the special Issue, "Early Cinema and the Archives" of the journal *The*

Moving Image: Christian Olesen, Giovanna Fossati, Eef Masson, Julia Noordegraaf, and Jasmijn van Gorp. "Colour Palettes of Early Film Distribution: The Case of EYE's Jean Desmet Collection," *The Moving Image* 16, no. 1 (forthcoming).