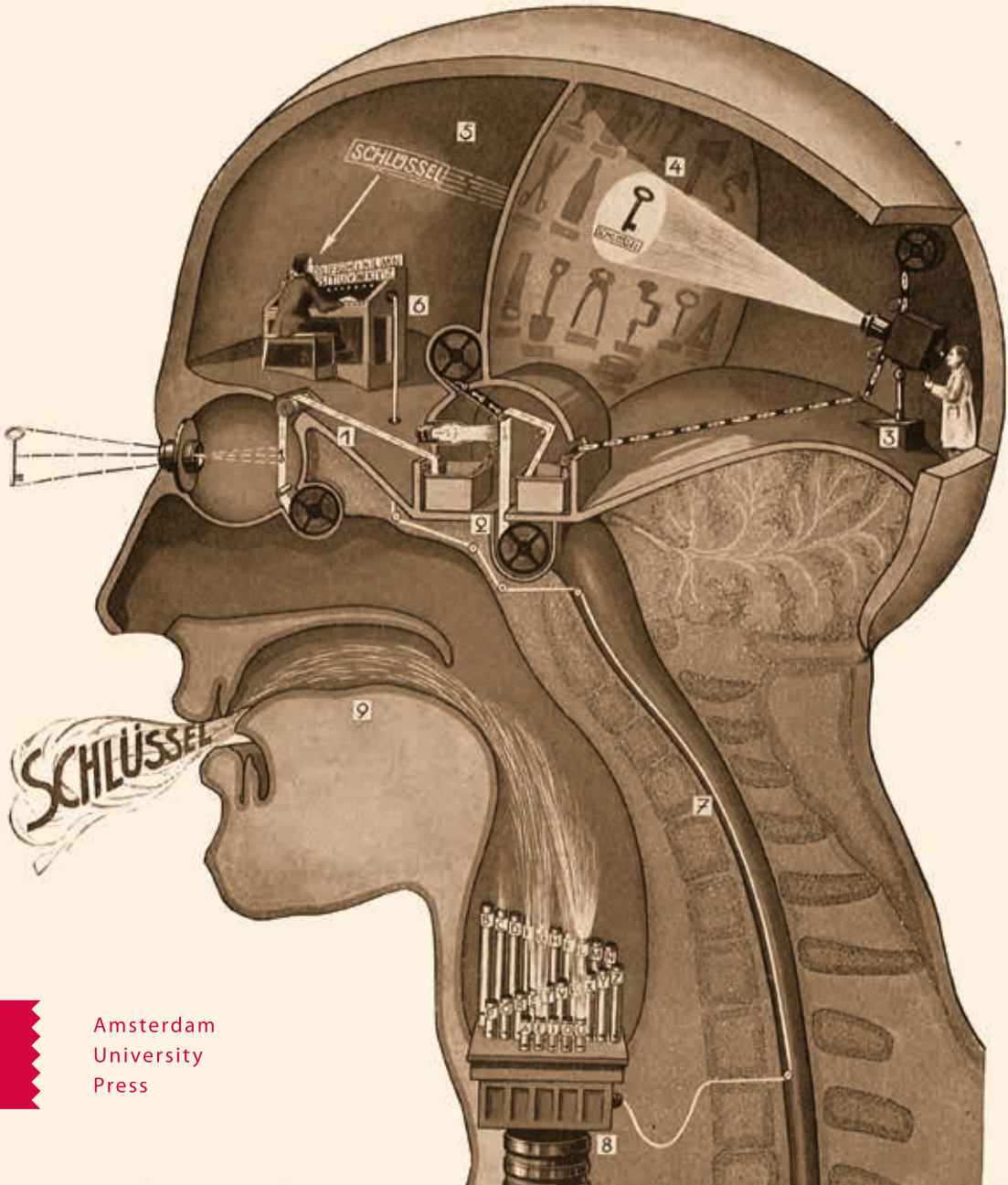
FILM THEORY IN MEDIA HISTORY

TECHNOLOGY AND FILM SCHOLARSHIP

EXPERIENCE, STUDY, THEORY

EDITED BY SANTIAGO HIDALGO
FOREWORD BY ANDRÉ GAUDREAULT



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Technology and Film Scholarship

Film Theory in Media History

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Foreword

André Gaudreault

Ever since the digital revolution radically blurred the boundaries between media, cinema – in any case, *cinema as it had been known* – is, according to some, in the midst of dying. In a recently published book (which I co-authored with Philippe Marion), entitled, incidentally, *The End of the Cinema?* (note the question mark),[1] we studied the effects of the most recent technological innovations on cinema and on the crisis that the medium faces in the digital age. We tried to show that though the medium itself is far from expiring, there is still *something of cinema* that is actually dying – even if only a certain 'idée du cinema', to use the French title of Dudley Andrew's recent book (2014).[2] While the digital turn produced a previously unprecedented *convergence* of media, this movement was concomitant with the production of a large number of *divergences* – between *what cinema was* (or rather, 'the idea' we had of what cinema was) before the transition to digital technology and *what cinema is becoming*.

Within the international community of film researchers, this digital turn has fueled many debates, which have logically led to the return of film technology as an integral element of film theory, film aesthetics, archiving and restoration, and discourse about film industry and film epistemology. What had once been at the margins of film studies, a distinct, circumscribed area of film history for aficionados, collectors and some notable researchers (such as Barry Salt, Paul Spehr and Deac Rossell, for example), has become a central hub of theoretical questioning. The impact of this confluence of media convergences and divergences thus initiated a new stage in the history of film studies. To give only two personal examples (relevant to this book), in the last six years I co-organized (with Martin Lefebvre) one of the largest film conferences ever on the effect of technological innovations on film theory and film historiography (*The Impact of Technological Innovations on the Historiography and Theory of Cinema*, or simply, IMPACT, in 2011 in Montreal); I also participated in the launch of an inter-university partnership, TECHNÈS (between Université de Lausanne, Université Rennes 2 and Université de Montréal, and other film institutions),[3] with the aim of producing a new digital encyclopedia of film technology, from its origins to the present day.

These new initiatives are outcomes of the fundamental, groundbreaking impact of the digital age, which not only changed the face of cinema in the form of special effects and viewing platforms, but also the underlying

tenets that provided cinema with a distinct identity (such as celluloid). This disintegration of identity and subsequent self-questioning have resulted in wholesale reorganizations of film departments, with the inclusion of video game studies and media studies, or the absorption of film itself within broader, more diffuse disciplines (such as film and moving image studies). In the midst of this, film technology has emerged as a new centralizing arena for film researchers to excavate, sort, and classify. Its identity *feels* clearer – clearer, at least, than the competing *ideas of cinema* – the materiality offering an objective reality on which to test old film theories and to fashion new ones.

So, then, what is the importance of these apparatuses and devices of all kinds for the theory and history of cinema? Have they contributed to opening up new ways of thinking and methodologies or to contest certain ideas received in the field of cinematographic studies? Notions as fundamental as realism, authenticity, or representation, for example, are now placed under the banner of technology, which determines their intrinsic modalities. Today, we speak of the language of new media. The tools of computer-assisted analysis developed for academic purposes (*Cinemetrics*, *Lignes de temps*, etc.)[4] are multiplying. Digitizing has revolutionized film restoration and archiving. Media issues become technological issues. The urgency of questioning the emergence and development of these discourses by putting them in their historical context is beyond question. These are the issues that the IMPACT film conference attempted to answer. Uniting over a hundred researchers of different backgrounds for a week-long, collective investigation of the impact of film technology on the history of film theory and historiography, the conference was a resounding success, with one reviewer calling it "*the* defining event in Film Studies in 2011"),[5] and produced a series of collections and publications.[6]

It also resulted in this important volume and collection of papers, organized around the notion of the impact of technology and the different phases of film scholarship, which is the end product of the work of researchers, teachers, archivists, and scholars. New technologies – not just those involved in the production of film – have revolutionized the way we think about and experience film. The works of my colleagues in this volume, many of which were first presented at the IMPACT conference, and selected and edited by Santiago Hidalgo, provide an authentic, vibrant account of where we stand today in the study of the relationship of technology and film, spanning from the beginnings (with the works of my post-Brighton early cinema studies colleagues Charles Musser and Tom Gunning), to the present day, with a new generation of scholars (Vinzenz Hediger, André Habib, and Benoît Turquety among them).

From the groundswell of energy, goodwill, and collaboration that sprung from the IMPACT film conference emerged the TECHNÈS partnership, in collaboration with Turquety (from Université de Lausanne) and Gilles Mouëllic (Université Rennes 2). The members of the TECHNÈS team will carry out, over the next seven years, an in-depth study of the links between film aesthetics and film techniques, practices and film forms, machineries and concepts of cinema, focusing on different moments of technological upheaval, stretching from the advent of the first projectors and chemical innovations that resulted in the projection of film strips, through the coming of sound and competition with the new mass media of television, to the ultimate integration of the new, digital, transmedial universe we all inhabit. Each of these moments was accompanied with a set of discourses, a set of practices, and a set of public and institutional usages, which constitute the object of study questioned and explored in this work. Not only is it an essential work, it marks a moment of passage between paradigms of film study.

Notes

1. Gaudreault and Marion, *The End of Cinema?*
2. Andrew, *Une idée du cinéma*.
3. The partnership, funded by the Social Sciences and Humanities Research Council of Canada (2015-2022), consists of 48 experienced Francophone and Anglophone international researchers and 18 partners, including three research groups (GRAFICS of the Université de Montréal, the Dispositifs group of the Université de Lausanne and the Arts pratiques et poétiques team of the Université Rennes 2), six institutions related to archival missions (the Cinémathèque québécoise, the Cinémathèque suisse, the Cinémathèque française, Bibliothèque et Archives nationales du Québec, the International Federation of Film Archives and the George Eastman House), three schools of cinema (Canada: Institut national de l'image et du son, Switzerland: the l'École cantonale d'art de Lausanne; France: the Ecole Nationale Supérieure des métiers de l'image et du son), and six producers/broadcasters/publishers (the National Film Board of Canada, Canal Savoir, the Presses de l'Université de Montréal, Amsterdam University Press, Érudit and Idéeclic). http://technes.org.
4. http://www.cinemetrics.lv/; http://www.iri.centrepompidou.fr/outils/lignes-de-temps/.
5. Fairfax, 'The Impact of Technological Innovations'.
6. Including André Gaudreault and Martin Lefebvre (eds), *Techniques et technologies. Modalités, usages et pratiques des dispositifs cinématographiques à travers l'histoire* (Presses universitaires de Rennes, 2015); André Gaudreault

and Martin Lefebvre (eds), 'Cinéma & technologie / Cinema & Technology', *Recherches sémiotiques | Semiotic Inquiry*, 31, nos 1-2-3 (2011); Martin Barnier and Jean-Pierre Sirois-Trahan (eds), 'Nouvelles pistes sur le son. Histoire, technologies et pratiques sonores,' *Cinémas*, 24, no. 1 (2014); Richard Bégin (ed.), 'Écran : théories et innovations,' *Écranosphère*, no. 1 (Winter 2014); Nicolas Dulac (ed.), *Du média au postmédia : continuités, rupture* (Lausanne: L'âge d'homme, forthcoming).

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Gaudreault, André and Philippe Marion. *The End of Cinema? A Medium in Crisis in the Digital Age* [*La fin du cinéma ? Un média en crise à l'ère du numérique*] (New York: Columbia University Press, 2015).

About the author

André Gaudreault is professor in the Département d'histoire de l'art et d'études cinématographiques at the Université de Montréal, Canada Research Chair in Cinema and Media Studies, and director of the Canadian section of the TECHNÈS international research partnership. As of 1992, he heads GRAFICS (Research Group on the Emergence and Development of Cinematic and Theatrical Institutions), and from 1997 to 2005, he was head of CRI (Center for Research on Intermediality). In 2010, in collaboration with filmmaker, producer and visiting professor Denis Héroux (producer of *Atlantic City* and *Quest for Fire*), he founded at the Université de Montréal the OCQ (Observatory of Cinema in Quebec) whose objective is to support the research and studies on cinema in Quebec. His publications include *From Plato to Lumière: Narration and Monstration in Literature and Cinema* (2009) and *Film and Attraction: From Kinematography to Cinema* (2011); he has also co-authored *The End of Cinema? A Medium in Crisis in the Digital Age* (with Philippe Marion, 2015) and *Le récit cinématographique. Films et séries télévisées* (with François Jost, 2017).

Introduction

The Discursive Spaces Between a History of Film Technology and Technological Experience

Santiago Hidalgo

In recent years, a renewed, diverse interest in the history and theory of film technology has emerged within film studies. Culminating in the weeklong IMPACT (*The Impact of Technological Innovations on the Historiography and Theory of Cinema*) conference,[1] from which many of the chapters in this collection are drawn, and the founding of the inter-university TECHNÈS International Research Partnership on Cinema Technology,[2] this research encompasses not only the history and operation of the various devices that constitute the production and exhibition of film, but also the effect of these advances on cinema experiences, study, and theorization. This line of questioning thus involves examining the dialectical relationships that exist between the materiality of technology, its surrounding discourses, and the integration of these as an experience and enduring element of consciousness, which continually transforms the way cinema and the world is apprehended. It also involves, as several chapters in this collection show, a rethinking of the concept of film technology.

Research on film technology seems to follow at least two overlapping orientations, which because of their dialectical nature open unique discursive spaces for reflecting on the impact of film technology. The first concerns the materiality and operation of film technology. As Benoît Turquety writes in this volume, the concept of technology seems "to delineate the realm of the hardware-related." Perhaps the most classic example of this research is Barry Salt's *Film Style & Technology: History and Analysis* (1983), a detailed investigation of the machinery that constitutes filmmaking and exhibition (cameras, projectors, and so forth). This tendency has been present within film history from the beginning, with the first historiographies concentrating almost exclusively on the devices themselves.[3] The same technology involved in the production and exhibition of cinema can also invert the gaze back onto cinema, through the use of editing consoles or VHS players that enable the manipulation of standard film viewing (such as freezing frames).[4] At the other end of this same spectrum is the impact of these technologies on film style, as with Salt's work, but also on film theory, historiography, and experience, as with this collection.

The other research orientation disregards the primacy of the machinery and devices, focusing instead on the shifting and elusive conceptual and philosophical problems that film technology as a phenomenon creates. Does film technology 'exteriorize' something essentially human, such as language and perception?[5] Is the mechanical reproduction of images an epiphenomenon analogous to the mind-body problem?[6] How do technological innovations differ from inventions, especially in terms of the historiographic model that is brought into play?[7] The particular physical properties of film technology are obviously germane, but broader questions are more prevalent, such as an interest in defining the terms of the debate and establishing a common set of objectives for orienting film technology research. It is reductive to suggest this orientation is purely theoretical, since it necessarily involves combining historiography and investigations into material technological changes, but it is nonetheless useful to conceptualize it as a different ongoing conversation about film technology that accompanies and occasionally enters the other line of research.

While these orientations provide a first level view of the way film technology is addressed as an object of study, and which are present within each chapter to different degrees, there are other ways of dividing these areas of research. This collection favors situating the chapters along the continuum of experience, study, and theory. Such a thematic structure highlights particular details and questions shared in common between authors, such as concerns about the definition of cinema and technology, types of exhibitions, and the use of new technologies for film study, but also proposes a visualization of the film activities that build progressively towards film scholarship; an experience of cinema leads to a process of study and reflection and eventually theory.[8]

Experience

In its minimalism and excitement, the first receptions of film technology reveal a range of film experiences that define the encounter between audiences and film technology. As such, many of the most enduring questions about the technological experience of film are distilled. Comprising a spectrum of internal and external events, the notion of 'film experience' brings under a single rubric many diverse, overlapping perspectives on the impact of film technology. At one end of the spectrum, experience refers to 'observing', 'living through', or, as Francesco Casetti writes, the "act of exposing ourselves to something that surprises and captures us."[9] From

the outset, film technology was a source of fascination and discussion in the press, especially in terms of its unique nature. These accounts, as one expects considering Lumière's *Arrival of the Train* 'founding myth' (in which audiences presumably confused film projections for reality),[10] were accompanied with a sense of wonder, as illustrated in a *New York Times* account of the 23 April 1896 screening:

> The new thing at Koster & Bial's last night was Edison's vitascope, exhibited for the first time. The ingenious inventor's latest toy is a projection of his kinetoscope figures, in stereopticon fashion, upon a white screen in a darkened hall.[11]

Remarkably, the writer noted in a single sentence all of the distinctive features that separated this invention from its predecessors – it consisted of the "projection" of "kinetoscope figures" (films) in "stereopticon fashion" (projector) on a "white screen" in a "darkened hall." This moment fits with what André Gaudreault and Philippe Marion define as cinema's "first birth," which reproduced "in a rather servile manner the other media from which they are to greater or lesser degrees derived."[12] The program itself was described with little reference to its photographic nature, only noting of one view that the "motions were clearly defined."[13] It was the technology on display that attracted the attention, likened to the spectacular artillery of a modern warship, "[i]n the centre of the balcony of the big music hall is a curious object, which looks from below like the double turret of a big monitor."[14]

While the writer recognized the traits that made this technological experience unique, it was not yet a question of conceptualizing it as cinema. As Charles Musser argues in his chapter 'When Did Cinema Become Cinema? Technology, History, and the Moving Pictures', cinema is "understood to involve something more than a technology [...] not just a new technological system of projected motion pictures." This is more than a terminological, or technological question, it requires a dual vision, seeing the usage of the technology from the perspective of the time, in terms of its naming, conceptualization, and associations with other practices, while maintaining a historiographic view for moments of 'rupture' in the domains of industry, aesthetics, exhibition, and technology. There is also, of course, Musser's interlocutor in this argument, André Gaudreault's own attempt to answer this question in terms of the overlapping paradigms of "kine-attractography" (which captures the sense of 'cinema of attractions', without committing to the term 'cinema' itself, since it was not yet instituted as a term or idea)

and "institutional cinema" (formed in the 1910s),[15] which also represents the medium's 'second birth', a moment when it becomes more autonomous in its expression (such as through editing). Instead, Musser proposes the year 1903 as a key transitional moment, in part because it answers both questions. Firstly, it saw the implementation of the "three-blade shutter on motion picture machines/projectors." This innovation "sharply reduced the flicker effect" and thus "made spectatorship much more pleasurable." This roughly coincided with the shift towards narrative film – a defining feature of cinema for Musser – since "reduced flicker facilitated the kinds of pleasures one associates with fantasy and fiction" (Musser's argument identifies other key turning points that year, such as post-production shifting from exhibitors to film manufactures.) Secondly, after the initial rush of press coverage, such as with the *New York Times* piece, these years represent a moment of relative inactivity, and therefore obscurity, in terms of discourse about cinema. As such, it is "perhaps also a moment of profound realignment and reconceptualization." The proof, according to Musser, is that once publications dedicated to film emerged (around 1906), they seemed to already understand it differently, "as a special kind of theatrical entertainment rather than an extension of the lantern or a visual newspaper."

The definition of cinema is surely tied to technological innovations, new film discourse, and shifts from film attractions to narrative, but it is also, as Musser notes, connected to the architectural environment of the event, which is to say, 'the cinema', a space dedicated to film projections alone. The second chapter in this section, Jan Olsson's 'Exhibition Practices in Transition: Spectators, Audiences, and Projectors', examines technological features of "the theatrical experience," arguing that "moving-picture experience is shaped by the interaction between two fundamental components of the cinematic apparatus: the projector [...]and the film base." A comparative study between Swedish and American exhibition practices leads Olsson to consider the extent to which the experience of "forgetting the theatrical situation" – a psychological film experience – is tied to the technological apparatus of the projector. Early cinema projections, Olsson argues, contained far too many interruptions to become immersive, but the advent of the "two-projector model" and its "continuous projection" contributed to creating a modern sense of film experience (namely, without programmed interruptions).[16] By contrast, Swedish exhibitions relied on single projectors. Relying on extensive archival experience, Olsson draws a series of contrasts between these two distinct receptions, which ultimately support his contention that continuous projection contributes to a sense of concerted engagement. Olsson is careful to mitigate the

essentialism of his claim by examining other spectatorship conditions. American audiences, for example, were accustomed to a "brisk tempo between vaudeville turns," thus the immersive effect of the two-projector model was potentially magnified with this already "restless" audience. In Sweden, "the absence of vaudeville culture" suggests that "audiences were not primed for uptempo entertainment," and thus less likely to raise this theme in film discourse.

With this perspective in mind, a detail from the *New York Times* account now seems more relevant, alluding to the projection experience Olsson describes. As the lights dimmed on that night, a more muted, personal tone entered the writing, indicating a transition towards a more personal and subjective film experience. "When the hall was darkened last night [...] an unusually bright light fell upon the screen [...] on which appeared moving figures [...] about half life size." Not only was it an encounter with a technology, but also with a new life form; beings that resembled humans, but who were also unfamiliar and strange. In this context, the concept of film experience now refers to its most powerful and enduring venue – conscious experience – rather than only referring to an external or psychological event. Maxim Gorky's 'On a Visit to the Kingdom of Shadows' is a quintessential example of an anecdotal approach to the 'subjective film experience', the sensations, images, thoughts, and impressions that appear in consciousness during film viewing, becoming, in a sense, a private, embodied theater of the mind.[17] "This mute, grey life finally begins to disturb and depress you," recalls Gorky, "your heart grows faint [...] strange imaginings invade your mind and your consciousness begins to wane and grow dim."[18] While rare, these tendencies in early film discourse often remain the most memorable, providing a view of an otherwise inaccessible reality. It is a mode of writing that turns attention inward, to the elusive, formless matter that whirls around awareness without ever becoming specific or distinct enough to be fully mastered and understood. The *New York Times* reporter confronted the same problem in attempting to define the audience experience when he writes, "the spectator's imagination filled the atmosphere with electricity, as sparks crackled around the swiftly moving, lifelike figures."[19]Although used metaphorically, the 'crackling' of film projections remains one of the most recognized features of cinema's identity, especially in the context of digital cinema. As J. Hoberman recently wrote, "the essence of film – if not cinema – is not so much a matter of the photographic indexical as the presence of a material flicker [...]"[20] Audiences did not just single out the new film technology as an attraction, or passively submit to its performance. Rather, film gradually became enmeshed in consciousness in a way that was

difficult to articulate and dissociate from past mental experiences – requiring an attention to the subjective experience of film in order to identify.

André Habib's chapter, 'Reel Changes: Post-mortem Cinephilia or the Resistance of Melancholia', "stems from a cinephilic anecdote, a true, lived experience," an approach that addresses this enmeshed film consciousness, while combining Gorky's anecdotal spirit with the *New York Time*'s reporters recognition of the visceral experience of film projections. Since anecdotes include the narrator as part of the story, the subjective experience serves as a portal into the "hidden dimensions of cinema history," from which a more general truth or knowledge is potentially gained. In his repeated viewings of a 35mm print of Terrence Malick's *The Tree of Life* (2011), Habib recounts becoming obsessed with something that was "not even *really* part of the film," the cue marks that indicate a change of reel and "a moment of changeover between two projectors" (Habib's chapter emerges, then, as a modern day, subjective examination of the historical experience Olsson describes in his chapter). In noting this experience, the cue marks become "a secret mode of access to the film," since each reel seems to represent a coherent thematic element within a broader argument. This apparent technical flaw of celluloid projections, which disrupts the continuous psychological film experience, thus initiates a 'private' stream of thought that accompanies the viewing, but which is centrally concerned with the film itself (as opposed to, say, daydreaming). If the cue marks, which are specific to film projections, disappear, as with video formats, then it would seem that Habib has discovered one of those mysterious features of film, as opposed to digital video, that constitutes cinema (or 'the film experience' – an idealized rendering of that experience that is constantly under revision according to new technologies.)

The final chapter of this section, Dana Cooley's 'Walter Benjamin's Play Room: Where the Future So Eloquently Nests, Or: What is Cinema Again?' inverts Musser's questioning of the definition of cinema by examining the other end of the story – an analysis of experimental filmmakers who have expanded, through their creative usage of film and technology, our understanding of the concept of cinema. To this end, Cooley combines two concepts for revising our understanding of cinema's possibilities (and perhaps of cinema itself). Following Walter Benjamin's notion of *Spielraum* or 'playroom', Cooley envisions cinema as "a space for training our faculties," which includes the experience of "light, space, (e)motion, touch, memory." The concept of 'expanded cinema', coined by Stan Vanderbeek in 1965 and further elaborated in Gene Youngblood's 1970 work,[21] "privileges an embodied, sentient experience" that brings the viewer to "draw upon

personal experiences." These dual concepts open a discursive space for Cooley to explore technological innovations in experimental cinema that contribute to producing a "lived experience". Tracing a history from the early twentieth-century avant-garde to twenty-first-century digital technologies, Cooley illustrates the potential of cinema as "play room", as a means of "closing the gap between bodily experience and abstract representation." An example of this effect is Julius von Bismarck and Andreas Schmelas's *The Space Beyond Me* (2010), an installation that incorporates a modified 16mm camera that projects a UV light onto a wall coated with phosphorescent paint. Programmed to physically mimic the camera movements of found footage films, the projector leaves a "ghostly trace" connecting "past and present." In creating unique experiences, and combining elements of film technology from different eras, these 'playrooms' thus problematize the question of cinema, continuing the debate about its essential nature.

Study

About fifteen years after the first film receptions, and beyond the period of obscurity that Musser describes, was the beginnings of a more institutional film discourse appearing in film trade publications, both in North America and Europe. In spite of the trade format, and the interests and writing that normally fell within such a venue, writers nevertheless explored topics and writing styles antithetical to trade press objectives (such as 'impressionist' writing that offered no commercially useful information about the film).[22] These journals were not a formal place of study, but the deadline imposed on writers to produce film discourse on a weekly basis encouraged a practice of exploring film from different perspectives, even those that did not always make institutional sense (which is one reason early film criticism often seems 'alien' to modern readers).[23] It is simply a fact of writing, and of amateur writers aspiring to become critics, that it will occasionally become idiosyncratic. In such a dynamic environment, and with the complexity of cinema before them, early writers thus engaged in 'film study'. This gaze was directed not just at film, but also at the practice of writing about film, with dozens of articles published on the subject during these formative years.[24] Among their concerns was audience reaction to different exhibition contexts, such as the placement of particular films within a program and the location of the theater. Because early film critics relied heavily on audience opinion to form judgments about the commercial value of films, resolving the

mechanism of reception, and its range of environments, was of primary concern – otherwise critics could not be certain that the film was the main cause of a positive or negative reaction. In so doing, critics began to question aspects of the film experience – with one critic observing that, "after seeing a picture again under different circumstances," it was "impossible" to find "agreement."[25] The repetition of viewing, and the analysis of these unique experiences, as Habib's chapter illustrated, is a practice grounded in film study. It is from this tradition of self-reflection – of seeing film under as many different circumstances as possible – that the following chapters emerge.

This desire to take films apart and examine its components under as many circumstances as possible is precisely one of the endpoints of film technology that is then turned back onto cinema itself. David Colangelo's chapter, 'Hitchcock, Film Studies, and New Media: The Impact of Technology on the Analysis of Film', examines the "[v]iewing environments and operations available to film scholars throughout history," but especially the history beginning in the 1950s. Each format and technology (16mm print, projector, flatbed editors, VHS, DVD) provide scholars with a different set of parameters for studying shots and sequences, which subsequently determines film interpretation, and, over time, film theory. Colangelo uses Alfred Hitchcock scholarship to elaborate this hypothesis. Early analysis of Hitchcock's films, according to Colangelo, involved "frantic note taking in darkened theatres," a physical limitation that resulted in "relatively short reflections" focusing on "themes." By contrast, later scholars were able to use viewing devices, such as VHS, to open films to much closer inspection thus leading to "lengthy, visually detailed, close, personal readings of film structures and of signs and moments in Hitchcock's works." Colangelo's research illustrates the value of studying trends in film theory as partially related to technological innovations, rather than as strictly outcomes of institutions, schools of thought, or dominant academic theories (such as psychoanalysis, structuralism, or formalism). This simple, but powerful, difference in viewing environments, as Colangelo shows, enables the study of shots and editing in a way that was previously not available to scholars at a broad scale (and which is now the dominant form of film study, even in film history).[26] The impact on consciousness of new viewing technologies is also a question that Colangelo considers. As with François Albera's theory of 'cinematic episteme', which assigned film technology an anthropological dimension in its capacity to render a picture of the mind ("images flying past, jumping about and dissolving, shown simultaneously or in juxtaposition"),[27] Colangelo finds that "the compulsive repetition and fragmentation

facilitated by the digital technologies" has led to "a blended sense of time, texts, and memory."

If Colangelo's chapter shows us the three-fold impact of technologies on film scholarship in term of formal analysis, film theory, and conscious experience, Charles O'Brien's chapter, 'Film Analysis and Statistics: A Field Report', illustrates a similar causal relationship between a new technology – software for counting and computing average shot length – and its complementary methodology – statistical and quantitative analysis. Cinematrics is an online tool for manually registering, in real time, the shot lengths and scale of any film viewed on an independent system.[28] It will then provide a series of visualizations of this data, including average shot length, median shot length, and some of their relationships. This data can then be correlated to different types of scenes or sequences. O'Brien's study concentrates on musical films during the transition from silent to sound cinema in the early 1930s. Three types of shots – 'singing shots', 'dialogue shots', and 'action shots' – are then correlated with the average and median shot length for certain films from the period. By adopting a statistical view that incorporates a broad set of data, certain details that were previously invisible become apparent, in this case the discovery that actions shots were less than a third the length of singing shots. However, "statistical results merely drew attention to the singing-shot phenomenon," which, as O'Brien shows, requires "additional, non-statistical critical methods" in order to contextualize and interpret. Statistical analysis is thus not an end, but rather provides a first level orientation. It is up to the historian to fill in the blanks. In this case, O'Brien identifies a cultural logic that is particular to conversion-era musicals, "the fascination [...] with singing performances in electric-sound movies" at the expense of narrative economy.

The preceding chapters have shown the value of applying technological innovations to film analysis, but such innovations are also instrumental (as the digital humanities has proven generally) to the way historical sources and documents containing film discourse are studied and analyzed. Just ten years ago, century-old newspapers and journals were consulted largely by microfilm, which required hours of scanning to find relatively small samples of pertinent data. In selecting and writing about a particular item, the historian served as the guarantee that a specific discourse existed in the magnitude and character described. With the advent of digital copies of newspapers and journals, as well as optical character recognition technology and search engines like Project Arclight,[29] it is now possible to search such documents for key terms

or topics at a massive scale. This has led to the quantification of key terms according to period and regions, although these results can be meaningless without context (the term 'art' does not necessarily reflect a concept of art). The impact on discourse analysis is significant – where time and accessibility limited the number, periods, and regions of journals that could be searched, new digital tools enable the visualization of data beyond a local level.

Paul Moore's A 'Distant Reading' of the 'Chaser Theory': Local Views and the Digital Generation of New Cinema History', is an ambitious illustration of this approach, arguing that "recently digitized newspaper databases allow the digital generation of cinema historians to imagine revising the analog generation's conclusions." In this case, the conclusions Moore seeks to revise concern the relative standing of cinema during the 'chaser' period (when films presumably appeared at the conclusion of vaudeville acts to clear the room). Moore's analysis of digital newspapers relies on Franco Moretti's theory of 'distant reading', which brings attention to "units that are much smaller or much larger than the text" such as "devices, themes, tropes – or genres and systems." From this vantage point. "digital search results allow the structure of mass practices to be visualized." Like a pointillist painting, seemingly random data points viewed collectively reveal trends and connections that otherwise remained invisible. At a practical level, 'distant reading' involves a "geographic flattening, since newspaper items from any location are weighted equally," rather than favoring the main centers of film activity, such as Chicago or New York. In Moore's case, the precise approach consisted of searching documents from a specific period for keywords – such as 'cinema' (or rather, terms that refer to 'cinema,' such as 'moving pictures') and 'vaudeville' – and then comparing the coincidence of these results with those from the preceding and following periods in order to determine tendencies, such as relative interest in these phenomena. While Moore presents the caveats that such conclusions merit, the quantitative evidence seems to show that from 1898 to 1902 there was "a gradual decline of cinema within vaudeville" followed by "a steady increase" with the "emergence of the fiction film and the nickelodeon." As with O'Brien's study, the first level picture that digital technology offers is only a starting point for further inquiry – presenting a set of questions that then become the subject of more contextualized approach. The spike in films following 1903 is not explained as a function of narrative alone, Moore discovers, but also because of a transcontinental fascination with 'local views' shown by itinerant exhibitors, which increased during this period as well.

Theory

I would like to return briefly to the opening text and the *New York Times* account of the first reception to illustrate a further point. The intricate nature of the technology, consisting of countless material components (camera, projector, filmstrip, lab processing, lens, and so forth) of different historical origins, and a rather perceptually elusive operational effect (the illusion of motion, moving pictures), renders the film experience a linguistic and terminological challenge. The reporter named the film projected on screen "kinetoscope figures," in part because they were originally exhibited in kinetoscopes, but also because no other term for naming the phenomenon appearing on screen existed. The experience of engaging with the ontology of cinema includes a process of drawing on *figurative* language from other domains of reference in order to name the objects and effects implicated in the creation of cinema. In so doing, a concealed conceptual world about cinema is revealed. While this struggle was evident in all areas of early film discourse, as expressed in historiography, advertisements, instructional manuals, and eventually criticism, the process of finding a language for speaking about cinema was also one of the means through which cinema's nature was discovered. In applying a term, even improperly, a hypothetical question is raised – does the term actually capture the nature of the phenomenon, or are there aspects of the phenomenon that are excluded? Each application was therefore a process of experimentation – chaotic in the early years, as Hopwood's history shows – and must be regarded as a distinct film experience, independent of film viewing. While 'film language' (the means through which films communicate and produce effects) would eventually become a dominant question of film theory, it was the language routinely applied to film that determined its ontological nature, separating it from some technologies and practices, while forming relationships with others, as with the writer's description of the Vitagraph device as a magic lantern "stereopticon." In one utterance, the writer's moving picture cosmology is revealed. These instances are multipliable across thousands of texts from the period that similarly engage in the naming, renaming, and misnaming of film technology, producing a discursive space that constantly confronted – although indirectly – cinema's nature.[30]

Similarly, Tom Gunning's 'Cine-Graphism: A New Approach to the Evolution of Film Language through Technology', uses early film terminology as a means of opening a conceptual domain that reveals a fact about the moment, but also perhaps a more essential truth about film technology: "the names of the first cinema devices inscribe their relations to writing and

language" with "the suffix 'graph', appearing if anything more often than the visual 'scope'." Relying on the work of Leroi-Gourhan, Gunning argues that "the acquisition of language and then of writing represents an essential phase of human evolution extended into technological exteriorization." Since cinema is both an "image *and* a form of writing" and "neither in isolation" – as reflected in the graph and scope suffixes that seem to compete for cinema's early definition – film technology "exteriorizes" human processes of language and perception in a manner that renders them recognizable, "in a form of technological memory." This graphic means of communication differs from the tenets of early film theory that centered on the "articulation between shots" (as with Soviet montage theorists) as the fundamental element of film language. While not dismissing it, Gunning prefers to set that theory of film aside, in favor of seeing the other characteristics of film technology that operate as language. Cinema's graphic nature, which Gunning defines as a "non-semiotic, understanding of cinema language," highlights the relationship between writing and the "bodily rhythms" of gestures, which can be grasped without a grammatical structure. A shot expresses a recognizable meaning independently of its relationship with other shots. As such, film technology constitutes a "major transformation of our human world" and a "contribution to the relation between technology and human evolution," in the same way that writing was an exteriorization of human speech.

Vinzenz Hediger, in 'Can We Have the Cave and Leave It Too? On the Meaning of Cinema as Technology', complements Gunning's argument, in that it also attempts to isolate features of film technology that "shapes and makes what we call the human possible." Hediger's chapter is illustrative of the interdisciplinarity necessary to studying the impact of film technology on modern culture. Too elusive and dispersed to be captured within a single theoretical framework, Hediger draws on ideas and discussions from film and media theory, philosophy of technology, aesthetics, epistemology, and anthropology to address this question. One of Hediger's concerns is that we appear to face an impossible conundrum when studying film; the focus will be either on "technology or meaning, but never on both simultaneously." This split means that we are "forever missing out on the meaning of cinema as technology." The *New York Times* reporter's marked shift in tone when the apparatus of film suddenly came to life now finds another meaning: it was constituted in the experience of witnessing the material and the immaterial forever separated, the gap between them irreconcilable as objects of study; for each, a different language, a different speech. This follows, in a way, the mind-body problem of consciousness; film is an epiphenomenon whose

causal relation to the material apparatus is difficult to establish, resulting in competing epistemologies. Hediger appears to argue, by way of films that present philosophical arguments about artificial intelligence, that technology can carry an "unconscious knowledge about what a human being is" and which "in fact turns into a driver of self-consciousness." As when the *New York Times* writer observed "the moving figures" on the screen "about half life size," the recording capacity of film brought into relation the human and the inhuman within a singular graphic image that produced, precisely, a moment of "self-consciousness." It is at this level of self-consciousness, about the body and mind, but also the body and the world, that film technology inexplicably manages to render comprehensible an enduring element of modern consciousness. Likewise, Hediger's reflections on these themes offer an opportunity to revise our understanding of the way this complex relationship between film technology and consciousness has been addressed within film studies.

The final chapter of this collection brings into question some of the premises underlying this collection, laying the groundwork for the next stage, a historiography capable of integrating several orientations on film technology – towards the materiality of the 'hardware' and towards the changing conceptual terrain that renders these details meaningful – within a single, unified vision. In 'On Viewfinders, Video Assist Systems, and Tape Splicers: Questioning the History of Techniques and Technology in Cinema', Benoît Turquety adopts an at times pragmatic perspective, defining the terms that define the history of film technology. Drawing on debates within the Annales School, which focused on the concept of technology, Turquety's novel approach includes identifying the gaps between French and English definitions of the same term, in order to separate the semantic from the conceptual. For instance, in French "a 'technological innovation' will designate a transformation in the field of the *discourses* about techniques." However, "this may or may not correspond to a technical innovation, i.e. the apparition of a new machine and/or a change in procedures." The issue at stake for Turquety is whether technology should encompass both the technical (machine and procedures) and the discourses about these technical innovations, which seem, depending on the linguistic framework, to cloud the understanding between "innovation" and "invention," terms crucial to the drawing of cause and effect relations within the historical field. The former creates continuities, while the latter indicates disruptions. In the end, the distinction Turquety draws between these terms appears mitigated, or resolved, through other related terms, such as "arrival" or "adaptation." To the degree a new technology, such as a viewfinder, appears the result of a

series incremental adaptations over a period time, with consequent effects on filmmaking procedures, and even the very conception of film space, it should be regarded as an innovation that calls into play "investigations of the internal logic of the machine" and "the procedures it is involved in at a given time."

With cinema becoming ever more dispersed and problematic to identify in the digital age, the study of film technology offers a common ground for situating this phenomenon within an objectively physical universe, a discursive space from which to look backward and forward concurrently, to the historical margins that seem to share similar anxieties, concerns, and excitement about the place of this new – and constantly renewed – technology within culture, society, and consciousness. Collectively, the chapters gathered in this volume illuminate some of the discursive spaces opened in the study of film technology, providing a necessary, and complementary, perspective within film and media studies for understanding the impact of film technology on the many areas of academic and public life. They reflect the on-going questions and concerns occupying this new field of study and suggest new paths for further research and consideration in the domains of experience, study, and theory.

Notes

1. Organized by André Gaudreault and Martin Lefebvre in Montreal on 1-6 November 2011.
2. The Technès partnership combines the efforts of three research groups, GRAFICS of the Université de Montréal, the Dispositifs group of the University of Lausanne and the Arts pratiques et poétiques team of the Université Rennes 2, as well many researchers, archivists, and film institutions with the goal of examining more closely the techniques and technologies that accompanied the medium's mutations, from its rise out of the audiovisual practices of the nineteenth century to the present-day diversity of its forms.
3. This historiography started already in 1898 with Hopwood's *Living Pictures*: *Their History, Photo-Production, and Practical Working* and continued in trade journal articles, instructional manuals, and books. See Popple's 'Cinema Wasn't Invented, It Growed': Technological Film Historiography Before 1913', where he argues that a technological history emerged, in part, to "contain" the "complex mesh of histories" that the "mongrel technology" of cinema presented. Kessler and Lenk elaborate on early film historiography in 'L'écriture de l'histoire au présent. Débuts de l'historiographie du cinema', dividing it into four overlapping tendencies, The establishment of a genealogy, debates over first inventors, the incorporation of history in the

description of film technology (such as in instruction manuals), and the beginning of an aesthetic history.

4. See Colangelo's chapter in this volume, 'Hitchcock, Film Studies, and New Media: The Impact of Technology on the Analysis of Film'.
5. See Gunning's chapter, 'Graphism: A New Approach to the Evolution of Film Language Through Technology'.
6. This is my interpretation of one of the problems Hediger raises in his chapter, 'Can We Have the Cave and Leave It Too? On the Meaning of Cinema as Technology'.
7. See Turquety's 'On Viewfinders, Video Assist Systems, and Tape Splicers: Questioning the History of Techniques and Technology in Cinema'.
8. Casetti defines this second phase as "an 'act of reelaborating [experience] into a knowledge and a competence, so that we are then richer in the face of things, since we are able to master them ('to have experience')." Casetti, 'Filmic Experience', 56.
9. Ibid.
10. See Loiperdinger's detailed analysis of the misconstrued comments that likely spawned the 'train arrival' myth in 'Lumiere's Arrival of the Train: Cinema's Founding Myth'.
11. Anon., 'Edison's Vitascope Cheered' (24 April 1896), 5.
12. Gaudreault and Marion, *The End of Cinema? A Medium in Crisis in the Digital Age*, 106
13. The views included *Umbrella Dance*, *Band Drill, Walton & Slavin* and *Serpentine or Skirt Dance*. List taken from Charles Musser, 'At the Beginning: Motion Picture Production Representation and Ideology at the Edison and Lumière Companies', 27.
14. Anon., 'Edison's Vitascope Cheered' (24 April 1896), 5.
15. See Gaudreault, *Film and Attraction*: *From Kinematography to Cinema.*
16. Maxim Gorky had defined the film experience in 1898 in precisely these terms, as "forgetting where you are." Over a century later, IMAX, which magnifies the effects of the theater experience for more media-immersed spectators, also identified this as its most essential feature, evoking Gorky's second person style of address: "you're outside among the stars [...] Sitting there, without the slightest doubt, convinced you're someplace else [...]'
    'The IMAX experience', https://www.imax.com/about/experience/.
17. This is also an allusion to the 'Cartesian Theater' idea of the mind, in which conscious experience consists of an 'inner' consciousness observing images passing by on an 'inner' screen. Philosophers like Daniel Dennett strongly dispute this model of consciousness. *Consciousness Explained* (Boston, MA: Little, Brown and Company, 1991), 111.
18. Gorky, 'The Lumière Cinematograph', 25.
19. Anon., 'Edison's Vitascope Cheered', 5.
20. Hoberman, *Film after Film*, 10. David Rodowick draws a similar observation about the materiality and experience of film projections in his *Virtual Life of Film*, "when reproduced on an electronic or digital screen, 35mm original

may never fully realize the phenomenological density of time, pastness, and causality of the projected film experience," 109.

21. Youngblood, *Expanded Cinema*.
22. See Hidalgo, 'Early American Film Publications: Film Consciousness, Self Consciousness', for more on the variety of film discourse found in trade publications.
23. I am appropriating here Gaudreault's comments about early films and applying it to first discourse about film, when he writes of very early films as having an "alien quality" that raises questions about intention. Gaudreault, *Film and Attraction*, 36
24. Ibid., 131.
25. 'Commenting on the Films', *Moving Picture World* 8, no. 15 (15 April 1911): 814.
26. Matthew Solomon's close study of the drawings in the backgrounds of Méliès's *Voyage dans la lune* (1903) – which contain information potentially relevant to the interpretation of the film – has led Solomon to conclude that Méliès intended his film to be viewed at a much slower speed. Thus, the ability to stop films, and enlarge images, may result in discoveries that revise prior conclusions about film history.
27. *Ibid*., 131.
28. http://www.cinemetrics.lv/index.php.
29. http://projectarclight.org/. "Arclight is a data mining and visualization tool for film and media history that allow users to analyze millions of pages of digitally scanned magazines and newspapers for trends related to a chosen subject."
30. So abundant and bizarre were these names that Henry V. Hopwood (who categorized moving pictures as "living pictures") referred to the collection of names applied to film technologies as "etymological monstrosities." *Living Pictures*, 187.

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