6.0 Conclusion and Further Perspectives

In my dissertation I have raised three interrelated questions to investigate knowledge production in a variety of contemporary digital dispositifs for film historical research. Through a number of case studies I elucidated their underlying methodological procedures and epistemologies while reflecting on how they recast scholarly traditions in style history and socio-economic cinema history. In this final conclusion I would like to reflect on what I learned from investigating the questions I raised one by one, and indicate the implications of my findings for future digital scholarship. Subsequently, I wish to point to further research directions by highlighting what I consider to be the clearest limitations of my dissertation's framework and results before I finish by offering a general concluding point on how I envision the film historian’s role in digital film historiography.

Scarcity of Source Material and the Need For Source Criticism

With my first research question I asked how film heritage institutions' selection and restoration practices condition digital scholarly research on film history. In order to answer this question, my first dissertation chapter offered a critical historical outline of the relations between film archiving and film historiography. This outline itemised a range of prominent historical discourses on archival sources reflected in early scientific film archiving, first-wave cinephile historiography, generalist film history, New Film History, Apparatus theory and audiovisual film history. Using this outline as a matrix for my dissertation's case studies, I analysed in Chapter Two how various historical discourses reflect in digitisation initiatives by European film heritage institutions on international, national and regional levels.

Chapter Two's discussion of digitisation first revealed a tension between the cinephile foundations of film heritage institutions and their intertwine with European and national heritage agendas. As I observed, digital projects subsidised by the European Commission are woven into a process of Europeanisation in which mass-digitisation of cultural heritage is promoted to sustain identity building. Actors in the film heritage field do not always consider this compatible with their institutions' cinephile legacy but engage in its discourse for funding purposes while maintaining their respective institutional missions. My research showed this by collecting and analysing data on European film heritage institutions' DVD releases. Based on this data I observed that there remains a strong emphasis on the classic cinephile canon and the most heralded periods of
film history. Moreover, a closer scrutiny of the individual DVD repertories of European film heritage institutions showed that - with few exceptions - institutions closely reflect their traditions and local priorities. As a consequence, their releases provide access to a broad range of materials, ranging from film classics to industrial and amateur films. Furthermore, a few institutions - in particular the British Film Institute, the Austrian Filmmuseum and La Cineteca di Bologna – go a step further and use the DVD format to facilitate the (re)discovery of archival rarities in a revisionist spirit. Consequently, the cinephile canon remains a strong reference point after digitisation, while the DVD format has also offered a site for revision and rediscovery, albeit to a limited extent. In this sense, a broad variety of histories is reflected in the shared DVD repertory of European film heritage institutions, yet the emphasis remains primarily on canonical material. However, whereas, on the one hand, the analysis of the DVD releases gave a good indication of the available repertories for film historiography, on the other hand, it was also limited in not taking into account the digitised collections available onsite or online, at the servers of the archives themselves. For this reason, I argued that it remains urgent to produce better statistics on digitisation to achieve deeper insights into the scope of especially on-site digitised collections of films and related materials.

An important conclusion to draw with regard to digitisation’s implications for digital scholarship is that the scope of film heritage digitisation remains highly limited and tied to individual institutional traditions. Moreover, in light of the low digitisation numbers, it seems misleading to apply the term mass-digitisation to describe the current state of affairs and more suited to speak of a scarcity of sources; researchers can access only a very limited selection of sources digitally. While they can process larger corpora with digital tools than in analogue research by performing big data and distant reading analysis, the variety of sources they can choose from is much smaller in a digitised collection. The conclusion that institutions reflect their traditions closely in their digitisation work holds implications for how scholars should approach digitised collections on several levels. Scholars need to critically understand that the digital repertories of film heritage institutions are small-scaled in comparison to analogue collections and that they tend to reflect specific institutional traditions, focusing on prestigious collections, regionally themed material, canonised directors, themes or periods. For scholars to develop a critical attitude towards their digitised source material, a good starting point is to attend to the traditions and missions of the institutions that collect, preserve and make it accessible to comprehend how those institutions’ digitisation work affect their range of choice. Furthermore, scholars might also consider taking a
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more active role to increase the variety of sources in digital scholarship by facilitating digitisation themselves. This can for instance be done by going to archives to explore analogue collections to see how a digitised collection reflects it or by budgetting digitisation costs when designing research projects.

To further answer my first research question I also attended to how various restoration philosophies reflect in DVD releases. Lending concepts from Fossati's *From Grain to Pixel*, classic restoration theory and the Bolognese school of film philology, I elucidated how the appearance of digital transfers on DVD result from institutionally specific scanning and restoration procedures. As I observed, digital restoration procedures and DVDs are important sites for institutions to negotiate the historicity of archival sources, in particular with regard to the visible appearance of film materiality. Beyond film archival practice I argued that such transfer and restoration practices hold significant implications for digital scholarship as they confine or support the analytical interventions of researchers. As I discussed in Chapter Three, the Digital Formalism project for instance maintained material features and artifacts instead of removing them with digital restoration techniques, despite the circumstance that this complicated the development of image analysis algorithms. This choice respected the Austrian Filmmuseum's vision of material signs of ageing as containers of historicity and had implications for the project's possibilities for intervening with automatic semantic annotation software. Beyond this example, as I pointed out in Chapter Four, the analysis of a broader range of image features, such as colour and light, is equally conditioned by restoration and transfer processes. In addition, I observed that digitisation also holds implications for the analysis of film-related paper sources. In New Cinema History, the scan quality of maps and OCR quality of text sources condition interventions such as text mining and GIS visualisation.

There is a need for film historians to understand that restoration and scanning practices have implications for how they can analyse and historicise their source material. They need to develop notions of source criticism in their scholarship by attending to the scan quality of digitised sources in relation to institutional traditions as conditioning factors for their analyses. The urgency of this need is further increased by the circumstance that scholars draw material from heterogeneous sources, not only film archives but also commercial releases or informal platforms which do not necessarily give elaborate details on scanning procedures. In for instance cinemetric analysis of light and colour in larger corpora, it poses a problem to use sources without elaborate technical specifications or similar standards. Scholars need to address such issues with attention to the different sources they process. For new cinema historians who work primarily with paper sources
and maps, source criticism can be developed by looking to literary studies and digital cartography which have discussed such issues in depth. For filmic sources, source criticism is a different matter which is less theorised and formalised. In my dissertation, I have suggested that film historians can develop more explicit procedures for source criticism of digitised archival material by engaging further with film restoration theory and the different traditions which have developed in this field since especially the 1980s. This may deepen their understanding of how digitisation condition their research practice, or simply help them highlight the uncertainties they have regarding the analysability of their sources when reflecting on their results.

In conclusion, I find it fitting to return to Philip Rosen’s discussion of digitisation’s implications for historiography to highlight that there remains a discrepancy between ideas and expectations projected in debates on digital archives and archival realities. As Rosen argues, academic debates on digitisation tend to be premised in the idea that “[i]n a fully realized digital utopia, such an electronic archive would presumably consist of all previously made images, now digitised and permanently available for such later uses”. Ideally, film heritage institutions would receive sufficient funding for digitising their entire analogue collections and for developing solid analogue and digital preservation programs simultaneously. Yet, this is currently not the case and the limited availability of source material is a consequence of this circumstance. Scholars need to draw attention to this or develop new research strategies in order to secure a greater variety. It remains pertinent to highlight that the petition launched by numerous media scholars at the Udine FilmForum in 2013, which I cited in Chapter Two, in favour of mass-digitisation of film heritage collections to improve conditions for digital archival research is as relevant today as it was then. Meanwhile, scholars need to reflect on how the digitised collections they access and use in their research reflect specific institutional policies of selection and restoration and condition their research interventions.

From Scientism to Methodological Pluralism

With my second research question, which primarily Chapters Three and Four revolved around, I asked which disciplinary negotiations digital methods undergo in their trajectories from the natural sciences into the film historian's toolkit. To answer this question I analysed a number of cases in the traditions of both style history and New Cinema History. To this end, I first argued that early quantitative historiography in the 1970s laid the foundation for a technical practice which has today

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972 Philip Rosen, op.cit., 323.
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developed into more complex, multi-faceted visual research dispositifs which scholars use for analysing specific problems of film and cinema history. In particular, the techniques of statistical style analysis and socio-economic history’s quantitative approaches have offered strong hermeneutical antecedents for contemporary digital scholarship. I observed that throughout the 1990s and the 2000s, digital scholarship was limited, seeing a few pioneering scholars becoming interested in the quantitative techniques and visual analytics of other disciplines such as computational linguistics, cliometrics and GIS. For instance, Yuri Tsivian, Karel Dibbets, Deb Verhoeven and Jeffrey Klenotic – to name but a few – saw that these fields’ techniques and representational practices could make relevant contributions for their respective research traditions; the quantitative methods of computational linguistics inspired new metric approaches to film style history and GIS could produce new spatial perspectives on the historical study of cinema distribution, exhibition and consumption. In the past decades, these traditions have seen a continued formalisation of methodological procedures which amalgamates analogue and digital analytical practices and scientific visual analytics in multimedia dissemination formats. The dispositifs which this development has resulted in are used for studying and disseminating research results of film-philological, archival research as well as research on the time-space patterns of film distribution and exhibition.

In Chapter Three, on the basis of my analysis of the Digital Formalism project, I discerned a philological research dispositif which arranges video clips in combination with data visualisations and annotations - both manual and automatic – in a multimedia environment, to produce visibilities of complex film and print relations. As a visual arrangement it allows for citation and comparative viewing of excerpts from archival film in medias res in combination with metric analysis. This dispositif uses especially non-reduced scientific visual analytics to draw attention to material and stylistic features of film prints as cue points for analysis. By foregrounding the data visualisations resulting from these procedures and attributing them a structuring function in the navigation and analysis of video fragments, scholars use them to attribute archival prints an evidentiary status in histories of style, production and distribution focusing on clearly delimited periods or oeuvres. As I have argued, this dispositif’s perspective can be characterised as visualising film history’s philological complex because it allows scholars to understand the inner dynamics of film editing by focusing on its smallest components in relation to the otherwise hidden side of its production history and its material elements’ archival life.

In Chapter Four, on the basis of my analyses of Early Cinema in Scotland, Going to the Show
and Data-driven Film History, I discerned a cartographic dispositif which scholars use to produce visibilities of historical time-space series of film distribution, exhibition and consumption. This dispositif draws heavily on GIS visualisation’s arrangement of map overlays originating in the earth sciences in combination with methodological procedures from Annales’ socio-economic historiography to process film-related sources. Through coding and mining of film-related sources new cinema historians discern patterns in them which, when plotted onto a map, produces visibilities of relations between exhibition location, industries, demographic data and changes in their relations over time. As I argued, the cartographic dispositif’s perspective should be considered multi-scopic. It carefully balances the macroscopic view proffered by Annales historiography’s serial approach to large datasets with the bottom-up perspective yielded by microhistory’s close reading of anecdotal sources. Developing in the lineage of these traditions, new cinema historians engage with digital cartography to discern and analyse the hitherto invisible spatial - and to a limited extent spatio-temporal - relations in their sources. In doing so it attributes an evidentiary function to film-related sources to understand relations between local human geographies, lived realities of cinema-going and consumption in relation to industrial modes of distribution and exhibition.

With regard to my second question’s focus on how the scientificity of these dispositifs’ visual regimes is negotiated, I observed that they are attributed different evidentiary statuses by researchers in the traditions they emanate from. At their core, they are both sustained by a profound engagement with and respect for history conceived as a (soft) science. The philological research dispositif is imbued with the scientistic aspirations which underpin its annotation practices and statistical concepts deriving from style analysis. The cartographic dispositif on the other hand has inherited Annales historiography's ambiguous relation to quantitative, computational history which concurrently invites scientific scrutiny of historical sources and reflexive stances towards its gauges. In both cases the traditions which these dispositifs emanate from are refined as scientific methods through technical and conceptual negotiation processes among their practitioners. For instance Cinemetrics’ addition of the MSL-parameter to style analysis’ ASL concept reflects how scholars produce new visibilities by questioning and refining already established scientific techniques and concepts to discern new patterns. In this sense, while scholars who practice these dispositifs do not necessarily conceive of film history as a science, a significant number of scholars working with quantitative approaches do pose as scientists and are inspired by the rigour and proceduralism of scientific discovery.
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Yet, beyond these two dispositifs scientific underpinnings, I also observed how, with the rise of the digital humanities, their visual regimes are turned in new heuristic and hermeneutical directions. While digital scholarship in film historiography to this day remains very limited, recent initiatives and projects in style history and New Cinema History challenge their scientific underpinnings. As I suggested in Chapter Three’s discussion of cinemetric methods, there is an emerging “humanistic” tendency today to develop and use visual analytics within a tradition of Exploratory Data Analysis which nourishes inductive rather than deductive reasoning, producing less finite results. In addition, cinemetrician Michael Casey's appropriation work One Million Seconds tentatively explored artistic data visualisation to highlight the underlying contingencies and ambiguities of the ACTION project’s visual analytics through a deconstructive gesture. In doing so he prompted historians to reflect on the shifting material basis of their analytical instruments and their implications for the interpretation of historical sources. Chapter Four’s discussion of GIS methods in New Cinema History sketched a development towards displaying greater ambiguity and inviting critical data interpretation to nurture a multiplicity of viewpoints. New cinema historians achieve this by endorsing collaborative annotation practices, transparency, open data as well as by engaging with Grounded Theory and humanistic interface design as propagated by Johanna Drucker. This has nurtured a move away from a conception of New Cinema History’s research practice as primarily empiricist and realist. As I discussed in Chapter Four, beyond film studies this development can be regarded as congruent with the processes of negotiating visual analytics’ evidentiary status in history and human geography. For instance, throughout the 1990s GIS methods from the earth sciences were subject to similar discussions among human geographers, who challenged aspects such as data accuracy and representational finitude to develop formats more suited for humanistic interpretation. Debates surrounding digital scholarship in film historiography sketch the contours of such a development.

To conclude, the introduction of scientific visual analytics into established traditions of film historiography reflects a double movement. On the one hand, it consolidates the scientificity of statistical approaches among a number of film historians who refine empiricist and scientific stances towards data visualisation for both style analysis and socio-economic history. On the other hand, it fosters approaches which proffer humanistic data visualisation to reflect the critical, hermeneutical legacies of the humanities. In this sense, the rise of the digital humanities draws the contours of an emerging methodological pluralism in digital film historiography. The growing  

973 Nadia Schuurman, op. cit., (2000.)
amount of digital scholarship on film history has led to a multiplication of initiatives where scientist conceptions of visual analytics increasingly rub shoulders with new humanistic approaches to visualisation of film data.

Towards Increased Reflexivity in Digital Film Historiography

My conclusion that the digital humanities nurtures a greater methodological pluralism in digital scholarship on film historiography brings me to my final research question. With my third question, I asked which strategies scholars developed for expressing reflexivity, ambiguity and multiple viewpoints in historical interpretation which relies on digital tools. Throughout the analysis of my case studies in Chapters Three and Four I identified a set of strategies which reflect such endeavours, and in Chapter Five I indicated future research avenues which may take these research strategies in new directions.

In my case studies I identified a range of strategies which nurture reflexivity, by engaging with approaches from social science research and statistics. One prominent strategy is transparency and open data. In most of the projects I discussed, research data is made available not only to allow other scholars to verify interpretation but also as a way of encouraging different data interpretations or possible discernments of data bias. New Cinema History's engagement with Grounded Theory is particularly illustrative because it acknowledges that different scholars may exhaust the same datasets at different points or find it necessary to complement datasets with additional data. Furthermore, while still not widely practiced, new cinema historians also endorse collaborative annotation to allow for multiple – possibly competing – viewpoints to be expressed within the same cartographic dispositif. As for cinemetric techniques and the philological dispositif, which scholars arguably practice in a more scientistic fashion, there appears to be less explicit endeavours for developing reflexive approaches. Yet, what I labelled as a “humanistic” strand of cinemetric methodology could be seen as gesturing towards reflexivity by highlighting and challenging the contingencies and underlying assumptions of digital film historiography's data analysis and visualisation. As mentioned in the previous section, I regarded the deconstructive pattern detection by Casey within the ACTION project as an artistic interrogation of scientific representational practices which invites reflexive approaches. Furthermore, this reflected in Ferguson's attitude which highlighted scientific visual analytics not as producing finite, observer-independent representations but as images that foster multiple and possibly idiosyncratic interpretations.

Beyond the dissertation's case studies, I have contributed to further developing reflexive
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strategies in two significant aspects. First of all, I have made a contribution by suggesting with my theoretical framework a meta-historical perspective on contemporary digital scholarship which can be used for outlining the methodological steps which scholars take when historicising digitised sources. Drawing on Michel de Certeau's theorisation of the historiographical operation in combination with François Albera and Maria Tortajada's disposif theory I have analysed contemporary research and dissemination formats as dispositifs of which the conceptual underpinnings and technical practices reflect specific knowledge formations and types of historical inquiry. Within this framework I have critically elucidated the methodological steps of digital scholarship so as to simultaneously invite scholars to use new tools and develop them in original directions. This theorisation in itself invites a reflexive approach because it encourages scholars to critically disassemble, reflect on and reconstruct digital techniques and methods. By analysing the methodological steps of digital research dispositifs – from the conceptual definitions of their analytical objects to the configuration of human-machinery interactions and representation - scholars may identify the aspects in which they are too reductionist, closed or do not allow for analytical intervention. Subsequently they may challenge, develop or appropriate them to their own ends to reveal alternative historical insights. Somewhat like Edward Branigan's table overview of types of historical inquiry in the late 1970s, which I cited in the introduction, I believe my framework may inspire increased reflexivity in today's digital scholarship by bringing attention to how the arrangement of digital dispositifs reflect specific historical discourses.

My fifth chapter made an additional contribution towards increased reflexivity in digital scholarship by suggesting new approaches to existing dispositifs. First of all, by suggesting that scholars seek productive combinations between automated pattern detection and idiosyncratic and anecdotal commentary and annotating practices. Inspired by the recent reinvigoration of cinephile theory and approaches in digital scholarship, I suggested that such a combination may counter reductionisms in quantitative analysis to identify and articulate new research directions. Second, I argued that scholars should seek collaboration with data artists in a less rule-bound field of knowledge production to challenge the assumptions of established traditions. Inspired by exchanges between academics, filmic appropriation art and archives and the deconstructive perspectives they produced on the former group's representational practices, I argued that scholars and film heritage institutions should facilitate artistic data visualisation of archival sources to develop complementary interpretations. This could take the form of initiatives such as artist-in-residence programs in film heritage institutions to produce data art from digitised collections, or collaborations between artists
and scholars to produce different visibilities with scholarly research dispositifs. If such initiatives will be realised is yet uncertain. Yet, I believe it would be immensely beneficial for digital film historiography at large as a way of critically reconsidering its relation to established concepts and research traditions.

To conclude, reflexive approaches in digital film historiography are still sparse and in need of further conceptualisation. Recent developments in digital scholarship in film studies and data art suggest new directions which may nurture such endeavours through new types of cinephilia and appropriation strategies which can lead to original combinations of automated analysis, annotation and visualisation. In order to realise more reflexive approaches, film historians need to attend to and acknowledge the idiosyncratic and artistic dimensions of data visualisation to a greater degree to invite the complementary and potentially challenging perspectives they may produce.

**Future Research Directions**

In addition to the above conclusions, I wish to indicate a few research directions which I did not cover in my research but which I see a future relevance of. First of all, I see a need for scholars to develop increased technical literacy. It remains difficult for humanities scholars to analyse the underlying algorithms of the tools with which they create approximations to their objects of analysis. Often we neglect that algorithms result from machine learning processes developed in step-wise programming phases conceived by computer scientists. My research has highlighted the importance of analysing such processes through its framework’s notion of technical practice while not being able to offer detailed, critical discussions of them. To give a concrete example, in my analysis of Digital Formalism it could have been relevant to look further into the research of programmers Dalibor Mitrović and Matthias Zeppelzauer which explains the project’s techniques from a computer science perspective. However, to do so would have required a technical literacy I do not (yet) possess. In this regard, I see an urgent need to develop a closer dialogue between computer scientists and film historians for the latter to familiarise themselves with the work processes of computer scientists. Hopefully, increased interdisciplinary research at the nexus of film studies, computer science and film archiving will nourish such dialogue in the coming years.

Second, I see a need for film historians to focus increasingly on interface and graphic design to further discuss how graphic arrangements steer data interpretation and how multi-modal arrangements of text, images and videos create meaning in digital dispositifs. My research

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downplayed this aspect slightly as I did not wish to focus primarily on visual communication but rather – with my use of the dispositif concept - to elucidate the relation between researcher, tradition, scholarly discourse, technical practice and visual arrangement. Recent scholarly work does focus on the visual dimension of digital scholarship more prominently to suggest best practices to a greater degree than I have done. I would encourage more research being done in such a direction. Adelheid Heftberger’s recent monograph *Kollision der Kader: Dziga Vertovs Filme, die Visualisierung ihrer Strukturen und die Digital Humanities* (Edition Text + Kritik, 2016), beyond delivering an insider’s account of the Digital Formalism project’s analysis of Vertov’s films, offers interesting reflections on data visualisation for formalist film analysis and thoughts on how to give shape to them. It engages with Rudolf Arnheim's visual communication theory articulated in his classic work *Visual Thinking* (University of California Press, 1969) to discuss relations between graphic design, reasoning and cognition. Such aspects may be useful for developing best practices or further critical discussion of digital scholarship on film historiography from a meta-historical perspective.

Finally, I would stress a need for further developing accreditation and evaluation of the research dispositifs I have discussed in film studies. My critical elucidation of these dispositifs has shown that they require as much thorough research, conceptualisation, planning and hard work as for instance writing a scholarly monograph. Digital scholarship is – as any original research – labour-intensive and not a simple novelty that works by pushing a button. Digital research dispositifs give scholars in specific traditions a sense of creating highly meaningful - sometimes better - approximations to their objects of study, through annotation, statistics, appropriation and visualisation, and they produce highly innovative results. On a personal level, I consider the Hyperkino series and the DVDs resulting from Digital Formalism among the most rewarding publications on film history I have engaged with. Furthermore, I would contend that Hyperkino is arguably the most ground breaking publication series on Soviet cinema in recent film historical research for the sheer variety of archival material and interpretations it has contributed with. With the current wave of audiovisual essays, map projects and historical databases our understanding of film history will increasingly be shaped through these and other research dispositifs. In this regard it remains an urgent problem – as well as a great pity - that few university institutions acknowledge their results as publications or have quality indicators for evaluating them. This in itself constitutes an important future research area.
To finish my conclusion I would like to end on a more general note by highlighting what I consider to be the main implication of my research for future digital scholarship by reiterating one of my introduction's key observations. Film historians who engage with digital research dispositifs need to become acutely aware that they are not primarily writers of film history but also image makers and observers. Their work amalgamates variegated analogue and digital analytical techniques which imply procedural human-machinery interactions to produce graphic representations of data, interfaces and inscription devices to think with, analyse and reason from. As a consequence, scholars need to be able to theorise the variety of visual representations they produce to a greater degree by understanding their underlying discourses, traditions and procedures critically. I consider this the crux of today's meta-historical discussion of film historiography – a discussion which is currently still limited in scope and which tends not to highlight such aspects of digital scholarship. Consequently there is a need to move away from a primary focus on literary models of history to instead understand the role of visualisations as symbolisations of historical data embedded in machineries of seeing through which we establish relations to the film medium's past.

This means that film historians should develop the ability to conceive and legitimise digital techniques and methods critically while carefully attending to interaction design and their visual structuration of data. They need to be able to carefully legitimise why they choose a specific visual component for representing and contemplating historical data in a dispositif; for instance a specific base-map for studying film distribution, a type of histogram or a data visualisation which arranges film frames in a particular way. I strongly agree with Tara McPherson's and Deb Verhoeven's suggestions, that film and media historians are in a privileged position to conceive data visualisations and interfaces because they have a grounding in a broad range of visual theories. Furthermore, film historians need to be thoroughly aware of the underlying conditioning factors of their dispositifs, comprising institutional discourses, technical interventions, traditions and policies, in order to be able to challenge and turn them in new directions. In the decades following the 1970s' historical turn, scholars began legitimising their preferred types of historical inquiry - for instance why they wrote a narrative film history or favoured foucauldian genealogy. Today, scholars need to consider the dimensions of knowledge production in digital scholarship which I have discussed in my dissertation. We are not yet there, but I hope my research’s meta-historical perspective provides a direction of where this may lead. In this sense film history might truly be in the making.