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Early Cinema and the Technological Imaginary

ENGLISH SUMMARY

The history of the invention of cinema technology has, for the most part, been regarded as a linear process of progress in which ideas were passed between individuals, either directly or indirectly, until one or two were in a position to promote a fully functioning system that could be exploited commercially. In contrast to this linearity, a great deal of work has been done since the 1970s to show how, after the invention stage, dominant film form and the various institutions of cinema were not inevitabilities of the technology, but the outcome of a network of conflicting imperatives as producers, distributors and exhibitors negotiated with prevailing social, economic and technological conditions. This thesis is the consequence of reviewing the literature on the beginnings of cinema with a view to reconciling the accounts of the invention of moving picture technology with current explanations of how film-form emerged after 1895. In the process, new evidence of the contemporary relationship between science, technology and entertainment has been brought to bear on a reconsideration of the processes of invention.

For the modern viewer of the very first films, the sense of historical isolation that they appear to carry can be perplexing. The look, subject and duration of the Lumière films of 1895 and those made by Edison around the same time, are difficult to reconcile with either the cinema that followed or the earlier experiments by Muybridge, Londe and Marey, – apparently inevitable technical stages in an incremental process of invention. The studied seriousness of the scientists working with chronophotography stands in stark contrast to the apparently trivial topics of the films made for public exhibition by the “real inventors” of the cinema. This difference appears to point to the conclusion that the audience for early cinema was unsophisticated and in the thrall of novelty; that there was a powerful appetite for moving images at the end of the 19th century, that inventors were involved in a hectic race to satisfy. Once a viable solution to the technical problems had been developed, the reservoir of pent up creative energy was released to produce a flood of production and consumption which sustained the emergence of a new industry. For over three quarters of a century this was indeed thought to be the case. Historians of the cinema began the story with the expectant audience already in place waiting for the invention. They went on to develop ever more complex chronologies which drew on earlier examples of popular spectacle to show that painted panoramas, dioramas, magic lantern shows and even photographs were incremental stages towards creating entertaining representations of the world that were ever closer to daily experience.

What these very chronologies have made increasingly clear, however, is that a single person did not invent the cinema at a given moment. They suggest that, around 1895, a raft of different technologies and representational strategies were brought together to form a single attraction. It appears that the basic optical principles which create the illusion of movement were well known for much of the 19th century, and the chemical foundations of cinema – flexible celluloid and fast photographic emulsions – were available well before 1895. It has
become apparent that the machines which took moving pictures, and those used to exhibit them, were reiterations of what was already available in some form or another, while the techniques of editing, and the trick effects of stopping the frame, (something that appeared quite early in the use of film) had precedents in many graphic novelties. In short, the chronological approach suggests that since there were no serious engineering or scientific obstacles to the invention of cinema several decades earlier, the “inventor’s” task was to combine a range of technologies in a single apparatus such as the Cinématographe (which comprised a camera, printer and projector), or devise a complementary system as with Edison’s Kinetograph and Kinetoscope or Paul’s appropriation of an existing camera and the development of a projector called the Theatrograph.

Only with hindsight, however, did the attraction of these combinations become at all obvious. There is reliable evidence for example, that Thomas Edison – perhaps one of the most astute inventors of the time – was satisfied with the peephole Kinetoscope and actively discouraged W K L Dickson from working on the projection of moving images, and that the Lumière brothers – successful manufacturers in the field of amateur photography – were so uninterested in the Cinématographe that they did not bother to attend the first public demonstration in 1895 and advised their friend, George Méliès, against buying one of their machines. Robert Paul also recalls his amazement at the crowds of showmen who blocked the stairway to his offices where he built Kinetoscopes, and even greater astonishment at being paid one pound per minute to show moving films with his Theatrograph at the Alhambra Theatre in London. Certainly, for those people actively involved in the most obvious processes of invention, the scale of the public enthusiasm for moving picture shows was quite unexpected, suggesting that the audience’s prior expectations were not a major consideration for the inventors.

This collective lack of foresight becomes less perplexing perhaps when one considers the spectrum of popular public entertainment available in the second half of the 19th century. Science lectures, sophisticated technological spectacles and ambitious expositions were well established as popular attractions. In addition, magic lanternists and others had been staging presentations for many years which included moving image projection using painted glass slides or moving bands of paper, compared with which the cinematograph was rather basic. In this context, the projection of moving photographic images must have appeared to the inventors as a rather modest lure. While the Kinetoscope and the Cinématographe may well have been expected to be something of a short-term attraction, technology per se, as a crucial factor in the consciousness of the time, had ‘advanced’ beyond these rather modest devices and the faltering images they produced. Edison was, after all, working on an expensive project to massively increase the productivity of the mining industry. Privately, he was musing on artificial life machines. The Lumière were deeply involved in research into carbon chemistry and colour photography, while Paul was evidently a highly sophisticated electrical engineer trained in telephony who, throughout his involvement in the film business, continued to work on high-grade scientific projects. It appears that making photographic images move to these inventors, did not seem to be a spectacular advance in either technology or entertainment, and its exhibition was quite reasonably expected to do no more than temporarily excite the public.
We now know that they were wrong and did not fully understand what they had ‘invented’. Virtually everyone who was involved in the early years of cinema had withdrawn from the business by 1910 (many left much earlier). Those who survived even this short time did so because they were sufficiently astute and intellectually agile businessmen to readjust their ideas to meet the contingencies that the unexpected enthusiasm of the public presented. In the light of the accumulating evidence about the inventors, the early years of the cinema and the entertainment context of its displays, it is time to revisit the literature; to begin to understand the invention of cinema not in terms of mono-causal (or even simultaneous) events but as a stabilisation of competing forces, in a way consistent with studies of later periods of cinema history, in particular, the period of the 1920s or that of the coming of sound.

The starting point of this thesis on the technological origins of moving picture devices (generically referred to here as the cinematograph) is the assertion that innovations are not the outcome of an internal property of technology, but are the consequences of contingent responses to the conflicting imperatives of both individuals and groups relative to the material state of technical possibilities. This approach contrasts with linear histories focusing on specific individuals and inventions. It situates technology as a dispersed intellectual and artisan practice in a broader social and economic context. However, it also avoids generalised assumptions about the nature of the network of factors which shape a technological artefact by insisting upon agreed evidence to identify the specific conflicting imperatives and the strategies used to reconcile them. It is the contention of this thesis that these forces must be satisfactorily stabilised and integrated before a technology (whether at the level of the individual artefact or the general system) can arrive at an accepted cultural meaning which, in turn, is one of the preconditions for its social uses and economic success. These opposed forces and competing tactics for reconciliation do not necessarily operate at a visible or immediately comprehensible level but, nonetheless, they leave traces for the historian and can be regarded as evidence of the various impulses at work which may be factored in.

Adopting this approach in the context of early cinema is especially appropriate, not least because, as a particular field of study, its own discourse has undergone significant revisions throughout the last century in response to major shifts in the way that culture and technology have been discussed and understood more generally. The moment of most marked rupture in the field of film history occurred in 1978 at the FIAF Conference in Brighton. It became the occasion where new film-historical and film-theoretical methodologies coincided with new policies of film conservation. Supported by fresh archival evidence this forced several major revisions of intellectual positions in the field. One of the most significant for the purposes of this thesis was the conviction that early films were not merely primitive versions of what followed but were often sophisticated visual expressions in their own right. The insights which have flowed from this revision under the rubric of “new film history” have sustained a generation of historians and inspired others to join the field to build a significant body of case studies, many of which have confirmed through factual evidence what had previously only been speculation. Film historians and theorists are now looking at the so-called classical period (1917-1967) not as the inevitable consequence of the inherent optical
and representational properties of basic film technology, but rather as the outcome of the conflicting interests of producers and exhibitors responding to social, economic and technological contingencies. In other words, they see even the most stable period of film history as a process of contending forces in a constant state of flux.

With some recent exceptions, however, film historians have been content to subscribe to a more or less ‘hard’ version of technological determinism when considering the so-called invention of the cinematograph. Consequently, much of the literature has implied that the imperative driving the inventors of the cinema was a shared obsession with illusions of movement. On the other hand, these gifted individuals, working at the thresholds of optical and chemical research, were also assumed to be responding to a teleology of “realism” thereby becoming agents of an inevitable trajectory of technical development. In this version of the pre-history of cinema, inventors were assumed to be engaged in a kind of baton relay-race or obstacle course with the finishing line of a fully formed cinema clearly visible ahead. Historical studies of the invention of cinema have, therefore, tended to focus on issues of patent rights, priority and the contributions of less well-known inventors. Such a line of enquiry, however, stands in awkward contradiction to the contextual approach to the subsequent innovation and diffusion of cinema as a popular entertainment medium. The first-past-the-post version has not only been at odds with the contextual approach predominantly adopted by the so-called new film historians, but it also stands in complete contrast to the tendencies in contemporary film theory to regard the audience as both historically specific and complicit in the processes of making meaning.

Discontent with this obvious inconsistency has led to some groundbreaking contextual studies (Michael Chanan), and the socio-political interventions of Noël Burch and Jean Louis Comolli, which challenge the questionable assumption that film technology drives film history. They have instead begun to examine the determining factors embedded in culture and economics, with the result that their interventions have been followed by studies of late 19th century culture arguing for a different kind of inevitability – that of the cinema as a response to the imperatives of Modernism (e.g. Charney and Schwartz). More recently, Deac Rossell has tested a non-linear approach to film history, outlining a broad network of patents and public demonstrations derived from his substantial chronology of moving picture devices. However, despite the evidence of multiple simultaneous invention, the startling speed with which the conflicting imperatives of the inventors and the public were stabilised into a dominant apparatus has tended to reinforce the perception of a single objective driving the invention. This has masked the significant differences within the determining constituency, not least the marked difference between what the inventors imagined that they were doing and what entrepreneurs and the public – quite literally – made of it. Over the last century, however, we have acquired a number of thorough accounts of the lives and work of leading inventors connected with the cinema. There have also been significant studies of other influential constituencies as well, including entrepreneurs from various backgrounds who presented the cinematograph in the multitude of forms that attracted the attention of the public. As is apparent from this literature, early cinema presents a complex case study of what technology as a set of experiences and beliefs might have represented at the close of the 19th century to both individuals and communities.
The present thesis situates itself in contemporary film studies and is concerned with early cinema and a specific issue of film history. Its intervention in "new film history" comes at a point when, despite the pioneering research of the 1970s and 1980s becoming consolidated into a substantial body of literature, cinema's precise periodisation is in increasing doubt. Evident uncertainty about the beginning of cinema, exemplified in the confusion around its centenary, is in danger of either deflecting attention to delimit the field of study in infinitely regressive pre-histories, or demanding ever more finely divided chronologies in order to proceed from an arbitrary beginning which hinges on a quasi-legal definition of the cinematograph. Neither approach would be consistent with the methods of "new film history". To avoid this, the thesis revisits the broad period which is generally used to mark the beginning in this field of study, that is, the pre-history of cinema, and draws on topics many of which have been alluded to in the literature as influential but which have not been the subject of concentrated attention.

The author's intention is to make a contribution to an established field of study at a point where, as it attracts a new generation of researchers, there is perceived to be a significant methodological contradiction which could inhibit further work. To achieve this, the thesis begins by looking once more at the difficulties that the substantial body of data, accumulated since the late 1970s, pose for further research into early cinema. It concludes that, where the impulse may have formerly been to synthesise the wealth of available findings to reduce difference, it may be more consistent to acknowledge the complexity and contradictions of the network of determinants, especially in the case of the invention of a device which has a crucial public dimension such as the cinematograph.

The thesis then follows this suggestion by examining Thomas Edison, the Lumière brothers and Robert Paul as case studies of inventors who are generally regarded as the most significant figures in early film history. Using established sources it looks at the accumulated evidence, as far as possible, within the same terms of reference for each inventor, to show how their individual solutions to technical problems were not necessarily engineering inevitabilities but can be seen as responses to a host of variable cultural, economic and personal circumstances made manifest in inventions which, even so, only partially account for their inventions. It finally points out that, since the differences between the 'inventors' are relatively well established, historians of early cinema have, in the past reached out beyond these figures to a host of subsidiary innovators in order to account for the emergence of a relatively universal entertainment. However, evidence has accumulated that each of these secondary contributors may also have been driven by equally complex and contradictory motives, and efforts to dissolve these differences, has drawn early cinema studies almost inexorably towards deterministic accounts of invention in order to resist total fragmentation. Since both technological determinism and fragmentation are unsustainable and inappropriate in the context of the established revisionist history which has emerged since the 1970s, it is necessary to begin again with other models of the processes of invention and innovation which are more appropriate to the case of moving picture technology and the field of early cinema history.

Drawing on evidence of the ways in which the public engaged with technology and science in a wide range of educational and entertainment contexts over a long period, the thesis
argues that there was considerable interaction between a number of distinct groups. Consequently, scientists, technologists and entrepreneurs involved in moving picture technologies, even at the formative stages, must be understood to have been working in an informal collaboration with the public themselves. The conclusion of the thesis claims that the cinematograph emerged from both the inventor's laboratories (with all their attendant complex variables) and the dynamic interaction between the public and a variety of accustomed modes of engagement with technology. This enables us to acknowledge the expanding data embedded in extensive chronologies of inventions, patents and public displays, while resisting the impulse to regard the cinematograph as a visible goal for the inventors. Most importantly, however, it provides a framework for understanding the invention of cinema which does not regard the audience as passively awaiting each new technological advance but as historically specific and equally as complicit in the process as they are considered to be when they are watching films. Apart from being more consistent with studies of technological emergence in other fields, this conclusion allows the historian of early cinema to proceed from the basis that the cinema can be understood, even in its "pre-history" phase, as the necessary stabilisation and integration of various conflicting forces, including the material state of technology. The field of Early Cinema can then begin, without apology, in media res, and proceed with consistency from the pre-history of the 'invention' to the prevailing discussions in film studies.