Early Cinema and the Technological Imaginary
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CHAPTER 1:  
The Discursive Background to the Invention of Cinema

The problem of the complexity of existing accounts of the invention of cinema

The sheer exuberance and unmasked creativity of films — even as early as the Lumière's Sortie des usine or Anabelle Whitford performing the butterfly dance for one of Edison's cameramen, William Heise — lend early cinema an air of innocence. Given some of the intellectually weightier issues in contemporary film studies, a study of early cinema and the apparently ingenuous question of how it was invented may appear to be as innocent as the films that Thomas Edison et al made. Kevin Brownlow has suggested, however, that this reputation of innocence is less than justified on the evidence of both the films themselves and a social history of the period. At the time that Brownlow was revisiting the period with a less than rosy eye, Thomas Elsaesser was reflecting on the state of film studies a decade after the FIAF conference in Brighton. The collection of essays in *Early Cinema; Space, Frame, Narrative* were assembled not only to revitalise the study of the first decades of cinema, but also to focus attention on what the film scholar's object of study might be. He sees a number of urgent questions:

For, finally, the double historical moment — that of the cinema between 1896 and 1917, and of its rediscovery in the late 1970s — does situate early cinema in a particular context, the one opened up by the revitalisation of film theory during the late 1960s and early 1970s, and its subsequent (post-Saussurean, post-Lacanian, post-modern) crisis in the 1980s. Hence several sets of questions have influenced the selection [in the Reader]. Firstly, how did the diverse technical processes and economic pressures feeding into early film production undergo the kind of integration that was necessary before film-making became an industry? Secondly, how did this industrial logic impose itself to the point of becoming inextricably bound up with the narrative logic of the cinema we call "classical"? Thirdly, and perhaps most intriguingly, given that the cinema manifests a unique combination of the drives towards pleasure and towards intelligibility, what is its psychic dimension, its cognitive role, its connection with the desire to picture the world in images and to experience it as doubled and mirrored, offering spectators idealised images of themselves, and therefore also letting us see other audience’s self images?*

Elsaesser's imbrication of the historical study of early cinema with the state of film theory proposes a remedy for the growing uncertainty about the status of film studies as a subject — a theme taken up at the same time by David Bordwell in *Making Meaning* and developed later with Noël Carroll in *Post Theory*. As production, distribution and exhibition practices undergo changes in response to digital technology, the uncertainties that we have harboured, and often repressed, about quite what cinema is have become intolerable. When in 1983 John Fell introduced *Film Before Griffith* with the observation that the early cinema community was suffering from an "embarrassment of riches in which particular benchmark films submerge now in a sea of titles", no doubt he felt that by introducing "material more
or less inaccessible to the younger student” he would stimulate high grade research to resolve some of the outstanding questions. However, a decade later the answer to such an apparently innocent question as, “When was cinema invented?” appears to be as elusive as ever. As the data has increased, so the embarrassment has become almost unbearable. Celebrations of cinema’s centenary reflected an uncertainty about the very object of film studies as, over a three year period, the United States, Britain and France variously staged high profile conferences and media events, each claiming to celebrate the beginning of cinema. At the defining moment of its centenary the academic community appeared not to know what cinema was. At stake in addressing the question of the technological origin of cinema is the ability of film studies to more clearly identify its object.

This section will revisit the orthodox accounts of the technological origins of cinema to emphasise the complexity and divergence of the motives and forces at work in the processes of invention and innovation. In order not to add to the “embarrassment of riches”, it will limit itself to the conditions in the three principle countries — the United States, France and Britain — where the cinematograph was initially exploited in ways that impinging on the subsequent universalised understanding of cinema. As a consequence, the discussion of the processes of invention will focus, by and large, on three of the main figures in the development of the cinematic apparatus as they appear in standard histories of the beginnings of cinema: Thomas Edison, the Lumière brothers and Robert Paul. It is a comparative analysis that proceeds from a widely accepted consensus that the Kinetoscope provided an inspirational basis for the technological development of moving picture devices. It is intended to show that, while there are considerable technical similarities between the various devices that they are specifically identified with, there are substantial differences between them at the “imaginary” level; that is, what it meant to the inventors. Each “inventor” was driven by distinctly different imperatives and initially had quite different understandings of the devices that they patented. The following chapters chart the various histories of invention, highlighting these differences to show that Edison’s Kinetoscope, the Lumière’s Cinématographe and Paul’s Theatroscope fulfilled different ambitions which were subsequently eroded as a relatively unified interpretation and use of the principles they shared became consolidated in an early form of cinema. The objective in revisiting existing historical accounts is to proceed more slowly, maintaining differences where they exist, and avoiding the temptation to infer a unity of purpose between the various players.

It is now generally understood that at the time when Thomas Edison and the Lumière brothers were developing machines for taking sequential photographs of moving objects and presenting the images in such a way that an illusion of movement was produced in the viewer, many other inventors were working along similar lines. The most frequent explanation for this diverse activity is the assumption that there has long existed the drive for a more realistic representation on the part of a public in search of distracting entertainment and that the cinematograph was, therefore, a response to a single strong cultural imperative. It is a convenience which suggests that the various inventors in the story of cinema were driven by similar, if not identical, purposes when ample evidence is presented that, while some experimenters were concerned with the synthesis of movement,
others were set on analysis. To be sure, figures such as Muybridge, and even Marey, often crossed the line between the two quite distinct objectives but they appear to remain separate in the inventors' minds. Marey, for example, restricts his references to attempts to construct a chronophotographic projector to the final page of *Movement*, and Muybridge re-animated his photographs only as an element in his road shows.¹³

Moreover, the imperative of realistic movement overlooks two important issues, or at least fails to fully mesh with a prehistory of audiences and screen practices. In the first place, the continued use of painted lantern slides after it was cheap and commonplace to use photography suggests that the distinction between illusion and realism was far less marked than it is today. The syncretic decors of early films, the use of wood engravings in preference to photo illustrations etc. bear further testimony to this. Moreover, throughout the 19th century, quite effective illusions of movement were, if not a commonplace, at least widely available in fairground attractions such as panoramas, dioramas, Otto Anschütz's Electrical Tachyscope and magic lantern shows. Reynaud's Théâtre Optique, which opened in the Musée Grévin in 1892 using a system of mirrors and painted bands, proved so popular that Reynaud was unable to meet the demand for new material and turned to photographic processes to speed up the production of hand-painted strips. Charles Musser's study of screen practices in the entertainment industry during the second half of the 19th century suggests that the experience of moving pictures — among others — was far from primitive in comparison with the first decade of cinema screenings when, more often than not, strips of moving film were shown as parts of other, more established and visually richer entertainments, such as magic lantern shows, theatrical exhibitions and vaudeville. The realist hypothesis idealises early film projections which, compared with the visual context of a magic lantern show, were rather degraded and impoverished images. Moreover, it obscures the fact that there were infinitely more exciting visceral sensations of movement to be gained by audiences at fairs, amusement parks and even through train travel than was on offer in early cinema. If there was no single inventor, as the evidence suggests, and if there were other, more dramatic, moving-image attractions, then we need an approach that can explain why cinema was invented when it was and what its appeal might have been.

These are not original questions. They arise from trends in film history that emerged in the late 1970s, under the influence of a wider tendency to revisit history from multiple vantage points as a challenge to an orthodoxy of nostalgia that skewed data to satisfy an ideologically-driven perception of the present. In film theory considerable effort went into deconstructing key texts that argued from a realist imperative that there was a language of film.¹⁴ Once realism is understood as a restricted explanation for film form, then the idea that early cinema is merely a period of learning to reach the objective of perfect mimesis is also dispersed. Other questions also emerge from the weakening of the mimesis argument about the invention of the technology. Most obviously, if inventors did not perceive desperation on the part of the public for realistic moving images, how do we account for the technological emergence (and enormous appeal) of a cinema machine which offered a visual experience that was, in many respects, inferior to the magic lantern or theatre? If the technology of cinema can be traced along a number of quite distinct pathways explored by quite separate individuals — the photochemical, the optical, the metaphysical and the
mechanical, as well as the analytical and the synthetic — what other explanation, apart from realism, can be offered for their reconciliation in a single, coherent device at a particular historical moment? If, as is widely accepted, for the first decade the films were largely an excuse to display the apparatus of cinema — in the broadest sense of the term — are we to assume that what was shown in this period was formless and without semantic density? This raises further anxieties about what followed in 1906; for example, is it feasible to attribute changes in film form entirely to the nickelodeon boom and purpose-built theatres, thereby consigning questions about the appearance of films, and their psychic and cognitive role, to economic history?

The increasing amount of data that has accumulated since Fell complained about the “embarrassment of riches” in 1983, and the collapse of consensus among academics about what exactly cinema is, has produced a surfeit of “free-floating information in search of synthesis”. Some attempts have been made to resituate the evidence in a broader cultural and media history context, for example by linking cinema with the shock of modernism, a pre-history of cinematic spectatorship and the more widespread engagement with machines of all kinds. Increasingly, the generality of this approach appears to present as many problems for the specific study of cinema as it solves, not least by increasing the burden of evidence that needs to be reconciled. What these broad cultural approaches appear to suggest, however, is a non-linear approach to organising the data that is quite specific to the invention of cinema.

Deac Rossell’s commitment to a non-linear history of cinema, which he attempts in Living Pictures, required as a preliminary the extensive Chronology of Cinema 1889-1896. In this he provides what he regards as an “...international chronology of cinema activity [which] can provide a solid foundation of factual material for such a re-examination of the ways in which film came into the world”. Rossell details the huge diversity of inventions, exhibition modes and patent litigation during the six years surrounding the activities of modern cinema’s technological innovation. Compiling data from the work of many historians, he identifies significant events to do with the invention and exhibition of various devices beginning from 14 January 1889. Although he announces that he will cover a period of six years, by far the greater proportion of the chronology is devoted to the months from January to December 1896, and this has a tendency to skew the perception of the data. It appears to show that during this period the cinematic apparatus progressively came to be recognised and understood as an exhibition machine for moving photographic images. It shows that initially this occurred at a small number of places in Europe and the United States and, after the first showing of the Lumière machine in 1895, there followed a general and quite rapid diffusion of both the Kinetoscope and Cinématographe, and their derivative machines, more generally throughout the world. As a consequence, the process appears to be one of the emergence of a kernel of a technological ideal into a fully-diffused cultural object. Such an emphasis on the technological determination of culture is teleological — the inevitable outcome of such a restricted periodisation — and, as such, is clearly problematic.

Rossell’s ambitions are a response to the infinite regression which various established genealogies and archaeologies of cinema have attempted. Marcel Lapierre, like a number of
other writers, begins with various examples of movement in entertainments, from Chinese shadow plays and Javanese puppets to the 18th and 19th-century use of the magic lantern, in order to show both a technical pre-history and a widespread cultural imperative for cinema. Similarly, Delesandes shows how the optical illusions of Plateau and Stampher foreshadow the Praxinoscope of Reynaud and, coupled with the photographic experiments by Muybridge, Marey, Friese-Greene and Demeny, lead us to Edison and entertainment. Cecil Hepworth’s *Animated Photography: The ABC of the Cinematograph*, published in 1900, provides an account of the practical steps necessary to provide a reliable machine which satisfies the audience with both continuous motion and sufficient illumination. This trajectory is repeated by both John Fell and Gerald Mast in their respective histories of early film. Writing concurrently with Hepworth, C F Jenkins opens his *Animated Pictures* with a biblical reference to Job and a quotation from Titus Lucretius that he has seen cinematically-fragmented movement. He then lists 150 multimonial machines with graph or scope in the title. Other histories have noted evidence from cave paintings in Northern Spain from around the year 20,000 BC, through Chinese shadow plays of 500 BC, via Leonardo da Vinci, to Kirchner’s phantasmagoria and Christian Huygen’s magic lantern in the 17th century. Rossell’s economy is ultimately tautological as, in order to avoid an unwieldy chronology embracing the whole of history, he is obliged to resort to an arbitrary definition of cinema.

An attempt to delimit the issues with thicker historical accounts has been made by Charles Musser in the *Emergence of Cinema*. Situating cinema in a history of screen entertainments, he revisits the supposed source of the scientific revolution in order to argue that it was the increasing post-medieval rationality that prepared the audience for cinema:

As Christopher Hill argues, the English Revolution of the 1640s marked the end of the Middle Ages in key areas of English social, economic, and cultural life. The resulting political and social structure was much more open to — even encouraged — capitalist production. Accompanying this development was an intellectual revolution that moved from proof by authority towards rationalism. While the emergence of the screen as a form of entertainment resulted from social and cultural changes, often referred to as the Seventeenth Century Scientific Revolution, it was not merely rapid progress in science and technology that made this emergence possible. As belief in ghosts declined, as witch burning ceased, the apparent logic and effectiveness of projecting apparatus as instruments of mystical terror also diminished. 

While such deep historical overviews may support a certain conviction about the continuities and ruptures of modalities of amusement and inscription, their necessary focus tends to exaggerate the importance of cinema and the social — even biological — imperative behind the inventions of the Lumière and Edison. Moreover, while it can explain a unity of purpose derived from a world view among a widely dispersed set of individuals, it is often difficult to substantiate any notion of a real exchange — relying, for example, on brief meetings between principles and the impact of mediators such as Georges Tissander to account for technical similarities.
The significance of these meetings is dependent on the idea that the participants shared a common direction. This may, however, be no more than a post-hoc rationalisation of individuals who were interested in similar things that, after the event, appear to be identical. Often it is clear that even among close collaborators there was a great divergence of opinion about what had been achieved and what might be the new objectives. Gordon Hendricks' extensive research into the contributions of Dickson and others to Edison's work with the Kinetoscope shows the extent to which the two men diverged in their opinions. Edison's cool response to Dickson's demonstration of a screened, synchronised sound projection, and his insistence that Dickson turn his attention to other projects at West Orange, suggest that Edison was concerned less with moving images — in the sense that Marey was — than with the development of a visual version of his commercially successful entertainment device, the phonograph. Similarly, the Lumière's were sufficiently unconvinced about the entertainment value of their machine that they could only envision a short-term economic life for their demonstrations of the Cinémagraphe, which they thought of as a technological spectacle. In Britain, R W Paul, an instrument maker by profession, was quite opportunist in his business dealings and made copies of the Kinetoscope. He saw a certain scope for increased profit from exhibition in changing the arrangement whereby the somewhat degraded viewing experience, as compared with the magic lantern, was enhanced by a collective screening. This group of men were in contact with each other and aware of each others' work. Yet there appears to be little consensus about what they hoped to achieve. The diverse aspirations for the various technological and conceptual contributions which film history has retrospectively unified into a single, often atavistic, objective does not suggest a genealogy for cinema so much as a confluence of disparate concerns, conveniently meshed in the last decade of the century, to explain cinema's technological origins.

However, as we shall see in the following chapters when we examine the complexity of the drives and inspirations of the principle inventors, it is only from the vantage point of the present that is it possible to claim their various attempts to animate the image as prehistoric forms of cinema. Undoubtedly, the interaction of ideas and individuals was of considerable significance to many developments of the late 19th century, including cinema, but the larger forces that made such exchanges meaningful and productive cannot be ignored, and it is these that may resolve the methodological deficit between "new film history's" account of film form and the technological history of the apparatus.

The diversity in moving image science and technology:
a matter of research and entertainment

It is immediately apparent from Rossell's chronology that many contributors to cinema's development came from a widely dispersed set of preoccupations with science, technology and entertainment. They became connected at the point of cinema technology, not always by a cultural imperative for realistic movement, but sometimes by the economic regime of the 19th century entrepreneur and the dynamics of popular entertainment. Men — although sometimes women, it was predominantly men — of insight and nerve brought together intellectual and economic resources to offer services for personal gain. What this intersection of discourses invariably leaves for the historian are the visible remains;
machines, films and publicity. Consequently, the histories of early cinema technology — as separate from the development of film form — tend to reflect the public perception of products and individuals rather than economic strategies and scientific discourses. These discourses and their collaborative interaction — compared with today's apparent separation — provide a seemingly overarching unity to technical work on tracing movement. In pure science in particular, Etienne Jules Marey, Albert Londe, Georges Demeny, as well as those with a more practical set of objectives, such as Eadweard Muybridge and Ottomar Anschütz, came together around a distinctive set of enquiries concerned more with the movement of humans and animals than with the technical objective of making moving pictures.

The most solidly scientific research centre concerned with movement was the Physiological Station, Paris, directed by Jules Etienne Marey who was not initially concerned with chronophotography. Another scientist, Pierre Janssen, was anxious to record the motion of planets on photo-sensitive material. In order to achieve this, Janssen built a serviceable apparatus that incrementally exposed a circular Daguerreotype plate. Although this machine was developed for a specific purpose — to record an astronomical event; the transit of Venus across the face of the sun on 8 December 1874 — he saw other applications for it in the field of the study of movement that he was willing to share, and he presented his machine in a lecture to the Académie des Sciences in 1876. It was sufficient to inspire Etienne Jules Marey to redirect some of his energies away from the orthographic inscriptions of movement — using rouged footprints, smoked drums etc. — to photographic devices and the objective realities of the chemical trace.

In 1882 Marey was able to produce photographs of birds in flight for the purposes of his study. Shortly afterwards he was able to persuade the authorities to establish a physiological research station in Paris. Here, among other things, he was able to develop more ambitious versions of the apparatus with much faster exposure times. Although Marey is often discussed as the father of motion picture photography, he was primarily part of a scientific community that was concerned as much with philosophical issues as experimental science. As Marta Braun has been able to show, the chief concern of his project was not the development of movement-recording devices but the philosophical definition of life through surface appearance. In his research he appears to have been quite willing to engage with lay people and quasi-scientific entertainers who did not share his professional preoccupations. This was not exceptional since, as we shall see, science was a relatively soft-walled profession even as late as the mid-19th century.

The relatively relaxed demarcation between professional scientists and demonstrators often resulted in individual mobility between one frame of reference and another. Just as Georges Demeny moved between the Physiological Station and the emergent entertainment industry, so Eadweard Muybridge functioned both as a showman photographer and a salaried university researcher. Initially, Muybridge was an accomplished landscape photographer and exhibitor who was commissioned by Leland Stanford to make a series of photographs of a horse to illustrate its galloping action. Had that been the sum of his contribution then possibly he would have remained an insignificant figure. However, although the results of Muybridge's original study of Leland Stanford's horse, Occident, may have had practical
significance for breeding and racing purposes, his principle importance lies in his work subsequent to this famous wager.

In the commercial exploitation of his achievement in road shows and lecture tours, Muybridge was much more concerned with showing images of movement and invariably demonstrated the technical aspects of his camera before showing the images. In the 1890s Muybridge also showed these images in rapid succession using a device called a Zoopraxiscope. He was a prolific photographer, and a tireless performer and self publicist, and his images and demonstrations fuelled a professional and lay preoccupation with science — not least in Thomas Edison. A number of commentators have remarked that the subject matter of his photographs, and the way that he presented them, suggests that he was not especially concerned with scientific projects but rather that the images legitimated particular regimes of looking at the body. In his nomadic crossing and re-crossing between science, technology and entertainment, and his obsession with the body as spectacle, Muybridge's achievements foreshadowed cinema as a cultural institution rather than the technological ensemble so often associated with his experimental work.

Muybridge's career with moving image technology shows the interaction between science and entertainment was not necessarily shaped by a hierarchy of gravitas since intellectual traffic between the two spheres was reciprocal. Georges Demeny, for example, was not only an important contributor to research at the Physiological Station in Paris but also a scientist who felt that he had a legitimate place in the business of entertainment. At the Physiological Station he was concerned with reconstituting movement through projection devices, partly as a therapeutic strategy in teaching lip reading. As such, he was regarded by Marey as being in profound opposition to the objectives of the research at the Physiological Station, and Demeny's insistence on developing projection equipment eventually caused a significant rift between the two men. He left Marey, with some acrimony, to join Gaumont and market the Cinématographe Demeny-Gaumont. Nonetheless, Marey concludes his book *Movement* (1895) with a generous account of machines which synthesise movement, particularly noting Demeny's Photophone.

The flexibility with which scientists became entertainers, or saw legitimate roles for themselves in the world of entertainment, extended also to individuals whose primary concern was as technologists and technicians. These people also felt that they might intervene at many levels in the concerns of professionals and lay people alike. However, since much of that which was achieved by this community was visible, and often remains as artefact, the crossover with entertainment in these pre-cinematic machines appears more pronounced. This group of professional technologists are most typically characterised by Thomas Edison as the "hands on" inventor but it included individuals from diverse backgrounds. Apart from one of Edison's assistants, W K L Dickson, the subject of Hendricks' study, a number of less-defined characters like Louis Prince, William Friese-Greene and his one-time collaborator, John Arthur Roe buck Rudge, Wordsworth Donisthorpe who patented the Kinesigraph, and Francis Jenkins, all have champions who bear witness to their importance. Like Edison, they were typical of many artisans in the second half of the century who addressed the technical limitations of still photography by
devising moving image devices in response to demands from different clients in the scientific and entertainment communities. Each of these apparently minor figures made some contribution to the technical history of cinema either by building primitive forms of the apparatus or solving particular technical problems, for example devising methods for registering the film precisely or the means for the intermittent transport of the film past the gate. Although in retrospect it can appear that they were concerned to rectify a deficiency in the existing apparatus, more often than not they had a complex relationship with science which they combined with the intention of making money from a public who shared their fascinations with the spectacle of technology.\textsuperscript{22}

Other important contributions to the development of cinema technology came from entertainers. Apart from Edison's unnamed technical team which also invented things to do with the apparatus, there was, for example, the Latham family — Woodville, Otway and Gray. They quickly saw the advantages of screening films — particularly boxing matches — which, as Charles Musser points out, not only allowed a faster turnover of patrons, but reduced capital costs by employing only one machine where formerly there had been six.\textsuperscript{23} The Lathams simply wanted an effect, while the engineers wanted to develop a system. It appears to be difficult at this distance, and possibly unnecessary, to unravel the precise areas of responsibility to the extent that, although it was either Dickson or Lauste that added a loop to the transport mechanism so removing the restriction on the length of the film, nonetheless this innovation became known as the "Latham loop". They were not especially technical people but as Musser suggests: "The Lathams' activities illustrate one way that technological expertise left the Edison laboratory when former employees set up rival firms."\textsuperscript{24} It also illustrates the comfortable integration of technologists and entertainers, collaborating on projects to realise ideas that were not fully defined in terms of outcomes by Edison himself.

A similar case is that of Norman Raff and Frank Gammon whose principle contribution to cinema history was facilitating the systematic introduction of projection to the United States. They bought 25 Edison Kinetoscopes and established them in phonograph parlours in a number of major cities. In response to declining revenues in the Kinetoscope trade, and a burgeoning industry based on duping Edison films which was threatening their livelihood, they put pressure on Edison to develop a projection system. He finally endorsed a projector designed by the inventors, Francis Jenkins and Thomas Armat (a real estate dealer), with his own name. Once they had persuaded Edison to regard moving pictures as a technology of theatrical display, they franchised the apparatus on a state-by-state basis, and so established not only the dominant mode of exhibition but also a network structure for the development of the industry. What followed from this fusion of technological and entertainment interests was a specific use for the machinery which had little bearing on the ambitions of its principle American inventor. Not only were the films projected, they were longer, and the investment which formerly had to be made in multiple machines could be diverted to other aspects of the experience of viewing.

Fuller histories often involve more characters, representing further partners in an interpretive process, adding depth to the history and reconciling the archival evidence of the films and their theatrical exhibition with an overdetermined account of the invention.
Georges Méliès, the inventor of the fantastic film, is nearly always introduced as something of a “software” visionary to account for fantasy films. Robert Paul is also cited as providing the precedent for theatrical exhibition. He projected images in Britain using his Theatrograph at the same time as the first Cinématographe demonstration took place in London’s Regent Street Polytechnic on 21 February 1896. Paul’s prominence in the British version of the early cinema story is also due to his subsequent production methods — which, like Méliès,’ foreshadowed a studio system — as well as his close association with one of early cinema’s most charming “directors” of story-telling films, Cecil Hepworth. Reconciling the process of invention with what the invention rapidly became used for immediately introduces an inelegant confusion that is often resolved by partisan histories such as Terry Ramsaye’s or accounts of national cinema such as those of John Barnes or Michael Chanan. Moreover, some individuals subsequently became glorified as geniuses rather than being viewed as symptoms, or conduits, of the variety of ideas brought to bear on cinema.

This reciprocity of exchange between scientists and a particular class of engineers we might now call technologists and entertainers, provides an image of the emergence of cinema that is complex, universal and driven by an overarching cultural imperative. This suggests there is an apparent need for a new approach to the history of cinema technology starting from an altogether different place. Such a history will not only provide a stronger bridge between the apparatus and film form, but might also propose a method for understanding how a technology of entertainment reaches levels of universal intelligibility through a process of active negotiation between all the shades of opinion and influence involved in the processes of interpretation. However, this is often reduced to a dispute about priority between Thomas Edison and the Lumièrè brothers. This is undoubtedly because, where Edison provided a mechanical basis for moving images, the Lumièrè brothers were clearly most able to make some claim to understanding the successful configuration of the machine ensemble as a screened event to a collective audience. Notwithstanding the various competing claims, their priority reduces the complex variety of interventions and discourses involved to manageable proportions; the one represents the invention of the machine, the others its commercial exploitation. However, this tendency in film history has had two important effects. First, it has provided the temptation to overlook the dialogic processes of invention, or simply to reduce them to recorded personal contacts between individuals as in the “Romance” histories of great men. This problem is well recognised but little progress has been made in alternative directions. Secondly, it has more or less excluded the interpretive function of some less visible factors in the formation of cinema as a public entertainment, such as the exhibitors and the audiences. This in turn leads to a fragmentation between cultural histories of the period — Allen, Chanan, Gunning, May — and histories of technology — Coe, Merritt, Salt et al.

Recovering unity: converging discourses and the individual
The three principle figures in the canon of early cinema, Thomas Edison, the Lumièrè brothers and Robert Paul, have persisted not least because each had positive connections to the networks that proved crucial in determining the ultimate shape of cinema. Despite the
convenience of this “great man approach” to the history of technology, it has progressively failed to explain the enduring questions of early cinema — what were its technological origins and why do the films look the way they do? However, regarding these principle actors in the history of cinema in a non-hierarchical way as symptomatic can show how the converging discourses of science, technology and entertainment interacted in the public sphere that financed its development. A comparative analysis of their engagement with technology and entertainment, together with a close examination of their individual motivations — as far as these can be ascertained — will go some way towards providing a framework for approaching these questions.

In the following chapter, the cases of Thomas Edison, August and Louis Lumière, and Robert Paul will be discussed in such a way as to emphasize significant difference which film histories have dubiously reconciled into an account of a single machine. They have been chosen principally because of their enduring historiographic status in orthodox accounts of the emergence of cinema. By comparing the three of them as case studies, using similar sets of terms, it will become evident that a mere chronology conceals significant differences in their individual interpretations of the technology. Any other explanatory model, therefore, must first address these differences if questions about the origins of cinema and the various meanings of some early films are to be answered. Examining these differences will not only show the development of moving picture technology as a complex interaction between a number of quite distinct parties and institutions, but also progressively raise questions about the processes of invention that will be addressed later in the thesis.