Storage, simultaneity, and the media technologies of modernity

William Uricchio

The motion picture medium during its first few decades offers a vivid instance of a nineteenth-century technology which simultaneously gave form to and was shaped by the conceptions of space, time and event which defined the culture of modernity. Whether we invoke modernity in Baudelaire's sense of the transitory, the fugitive and the contingent, or the sense of the mass reproduction attendant to modern industrial production, the film medium has been emblematic. Not surprisingly, these two very different senses of modernity infuse our understanding of the medium's early years, linking the physiological studies undertaken by Muybridge and Marey, the motion analysis studies by Frank and Lillian Gilbreth, and the fragmentary and relativistic notions of space and temporality celebrated in the cinematic and meta-cinematic work of Léger, Duchamp, Pirandello and commodified for a mass public by the pantheon of early film directors. However, despite its embeddedness in the fabric of modernity, and despite its frequent invocation as an analogue for the modern, the cinema's relationship to modernity is not unproblematic. In the pages ahead, I shall address some of its complications, especially as they relate to the historical conception of moving image media. By reconsidering the horizon of expectations which greeted the appearance of the film medium, I hope to problematise aspects of the fin-de-siècle notion of mediality and pursue some of the implications both for the definition and reception of early film and electronic media, issues which resonate with the new digital media technologies and, more generally, with our historical vision of media development.

The film medium's definition and inscription as a technology and cultural practice, despite the efforts of the post-Brighton conference generation of film historians, has tended to be positioned within a teleologically-oriented notion of technological development.[1] Of course, the last two decades of film historical scholarship have successfully complicated our understanding of narrative, performance and other signifying practices. Moreover, some scholars have taken pains to delineate the conditions of reception attendant to the medium's first audiences.[2] But with a few significant exceptions, such work has tended to be textual in orientation, revealing film studies' genealogical links to the discourses of literary studies and art history. Significant aspects of film's status as a medium have thus been marginalised, and among the most significant has been the issue of time.[3]

Long before the advent of computer-enhanced virtual realities, film together with other late nineteenth-century inventions such as the telephone and phonograph 'virtually' extended human perceptions to events and locations beyond their physical and temporal bounds. Film, like its sister communication technologies and the transformations in industrial production and transportation networks, both stimulated and facilitated a new

experience of time, space and event. Although the cultural implications of this change would be realised and celebrated with the appearance of the concept of modernism, a less desirable result appeared on the pages of medical and sociological journals. The generation which underwent this reconstruction of experience – from the idiosyncrasies of local time to the rigors of universal time; from distance traversed by foot or steam and measured in days, to the transgression of space by telephone and aeroplane and measured in time-zones – seemed particularly prone to a battery of new diseases. By the turn of the century, fragmentation, alienation, neurasthenia, over-stimulation, even 'Newyork-itis' plagued the neural networks of those undergoing the reorientation from one cultural time/space to another.[4]

Film's temporal claims – the *actualité*

The construction of time, film's real site of ontological and epistemological distinction, offered powerful new ways of seeing (beyond the feat of seeing into the past), in the process offering both a backdrop and set of analogues for theorists from Bergson to Deleuze to use in their work on temporality. Leaving aside for a moment the referential temporality of the dramatic narrative film, where tenses as well as duration constitute the fabric of the fiction, I turn to the early *actualité* for exemplification.[5] The shock of time evident in the radical compression of fast motion or the extension of slow motion, in the impossibility of reverse motion and stop-motion, transformed topics like the blossoming of flowers (*Nature's Fairest*, Gaumont, 1912) or the life-cycle of flies (*Flies*, Eclipse-Urbanora, 1913) into documents of unexpected cultural relevance. Particularly at a cultural moment when the relations among time, space and experience were being debated in fields as diverse as sociology (Simmel), physics (Einstein) and painting (the Cubo-Futurists), film offered its audiences a powerful way to explore conceptions of time which would otherwise have remained vague abstractions. The experience of time in its many modes must be considered as 'actual' and as sensational a topic as its more frequently discussed spatial corollary, images of remote or exotic locations.[6] Having said that, we must recall that the spatialisation of time was often linked with remote locations, a phenomenon particularly evident with train-mounted panorama shots. These images, discussed by Lynne Kirby, recall Wolfgang Schivelbusch's discussion of the 'shock' and 'annihilation of space and time' experienced by early train travellers, experiences perhaps not so different from those experienced in the seats of cinemas.[7]

Many early non-fiction film subjects extended a notion of documentation and temporality established in the illustrated press since the early 1880s. Paradoxically, the still photograph established the dominant horizon of representational expectations. The introduction of relatively low cost printing techniques in the last quarter of the nineteenth century together with the proliferation of the illustrated newspaper and magazine, the stereograph and picture postcard, served quickly to stabilise certain representational conventions.[8] On the production side, one can see similarities within pictorial compositions, image typologies, and markets between news photographs and moving pictures. Halftone photographic images of fires, parades, crowded city streets, disasters, and industrial processes and technology tended to dominate the new visual discourse in a process of standardisation driven by producers, buyers and audiences. The extension of these practices in the film medium may be seen among other places in American Mutascope and Biograph's turn-of-the-century 68mm 'living postcard' series attesting to the intertextual 'fixing' of certain cinematic conventions not only by well-established production practices particularly evident in the press, but by the intertextually-positioned expectations of viewers, again, largely informed by their exposures to the press.

Motion pictures, however much they might have dwelt on the sites/sights of modernity as articulated and circulated by the illustrated press, nevertheless struggled to achieve the press's sense of immediacy. Press photographs regularly made the transition from camera to printed page within the day, with the weekly illustrated press obviously extending the time delay. At least through the first

decades of the twentieth century, this tempo was dampened a bit by the relatively long circulation life of the printed image with, for example, the recycling of illustrated papers through the hands of multiple readers. But even so, the news photograph had a sense of currency that the slower production and distribution cycles of the motion picture had difficulty achieving. The logistics of printing multiple film copies and distributing them through a cumbersome (and frequently changing) system of exchanges forced the cinematic notion of currency to be far more expansive. Particularly before the routinised circulation of newsreels by the early 1910s, the 'news' value of films was severely compromised vis-à-vis that of the illustrated press (with several striking exceptions such as *Grand National* (Barker, 1911) which was reportedly processed on a train to London immediately after the race in order to permit same-day screening at Barker's music hall,[9] a technique used as well with footage of the Prince of Wales' investiture at Carnarvon that same year).[10] From the perspective of its audiences, the recasting of that most temporally marked of film genres, the *actualité*, into a process delayed by months risked transforming the meaning of certain topics.

But if the *actualité* could be identified through its engagement with time and its doomed evocation of currency, it also seemed to be characterised by an attempt to evoke the 'actual' in the sense of 'presence'. Judging by many early humorous and exaggerated reports, the attempt to achieve a kind of presence seems to have come easily to film. Films such as *Uncle Josh at the Picture Show* together with anecdotal (often apocryphal) reports about early audiences behaving as though screen images had the same ontological status as the viewers themselves, suggest that at least the issue of the film medium's convincing level of verisimilitude was open for discussion.[11] Terms like *lebende Bilder*, *bioscoop*, and *vitascope* attest to the positioning of the medium not only through the spatial mimetic capacities already well known through photography, but through temporal mimetic capacities and the ability to represent duration and movement. The flow of traffic at busy intersections, the manner in which dignitaries walked, rode and deported themselves, and the mesmerising action of fires and industrial machines, all articulated a dimension of experience which was frequently described in period reports as 'liveness'.

The discourse of 'liveness' may at first seem contradictory when applied to a medium which lagged behind in the race for immediacy with the newspaper photograph. But as we shall see, period use made no real distinction between the 'liveness' of simultaneity and the 'liveness' of a storage medium, suggesting either an imprecision of use or a confusion that carried over into cinematic representation. Nevertheless, this knowingly deficient sense of film's 'liveness' was frequently celebrated by the medium's early description as 'a window on the world', a phrase which attested to the perception of *actualité* in the most literal sense.

Competing temporalities

Despite all of these developments, film failed to live up to a set of temporal expectations in place since the invention of the telephone in 1876. In this regard, perhaps the most important emblem of alternate visions of technologically-enabled temporality appeared at the 1900 world exhibition in Paris. A compendium of the new, the exposition provided an elaborated intertextual frame for appreciating the dissonant and competing spatio-temporal representational systems available as cinema took its place. Thomas Kuchenbuch's portrait of the exposition needs no retelling, but the fascination of the exhibit in part stems from the way in which mechanical visual storage systems (the cinéorama with its 360-degree synchronised 70mm film images of a balloon flight) competed with real-time electrical visual transmission systems (the earthograph image telegraph).[12] Although the film medium's popularity was yet to be realised, the early variations on the telegraph and telephone directly addressed the period's interest in speed and simultaneity, and would eventually do much to refine the definitions of the film and television media, and with them, a new sense of subjectivity.

Systems such as the earthograph and Waldemar Poulsen's telegraphone (essentially a magnetic telephone answering machine) directly addressed the period's interest in elec-

tro-magnetic radiation, and were related in the public's mind with the rapid advances taking place in wireless telegraphy, with speed and simultaneity. This linkage is not as strange as it might at first appear, especially considering the rapid pace of telegraphy's development in the period. For example, the first recorded distress signal from ship to shore was sent the year before the 1900 exhibition, and within one year, Marconi sent the first trans-Atlantic transmission. Such concrete and sensational articulations of a temporality only suggested by the cinema obviously exacerbated a deep and – since the advent of the telegraph – a growing tension in the conception of time, and in particular, the notion of simultaneity. Stephen Kern has neatly summarised the period's dilemma regarding the nature of the present:

> Thinking on the subject was divided over two basic issues: whether the present is a sequence of single local events or a simultaneity of multiple distant events, and whether the present is an infinitesimal slice of time between past and future or of more extended duration.[13]

This duality recalls the two views which Zeno addressed in his paradoxes (and which, in turn, were refuted by Bergson, who grappled with the problem of spatialising time).[14] Zeno's paradoxes intervened into the competing views of Heraclitus, who took the position that time was discontinuous and conflicting, and that the apparent connectedness and flow of events was but illusion, and Parmenides, who took the view that time is an extended state of being. These two pre-Socratic philosophers help to underscore the key temporal differences not only of the fin-de-siècle, but more significantly of the film and television media. Heraclitus' view, with a discontinuous reality and illusionistic appearance of continuity, is consistent with the temporality of the film medium, in the same way that Parmenides' view of an extended state of being is continuous with (ideal-typical) television. The problem of the late nineteenth century, and as we will see, even of contemporary thinking, is that in some fundamental ways the temporal attributes of the film medium are confused.

The camera obscura – film's identity problem

Our collective understanding of the past encourages something like a self-fulfilling prophecy. The logics and systems that have been inscribed in our histories situate not only our perceptions and expectations, but also inform the choices of the material we seek, save and admit as evidence into our archives and arguments. Even assuming this dynamic of mutually reinforcing ideas and evidence, however, the search for 'broad patterns' and 'collective understanding' is complicated by a number of structural factors. Can we speak of 'orthodoxy' with regard to media history? The last decade or two have perhaps given ample reason to argue 'no'. In television's case, most historical research is so recent that orthodoxy is not yet an issue. In film's case, the 1985 publication of *The Classical Hollywood Cinema* formally laid to rest the canon of film masterpieces so carefully cultivated by our critical forefathers (and still in evidence in film studies curricula). Its authors mapped the development of film style, production organisation and technology while steering clear of the canonised aesthetic criteria and films which had for so long served as reference points to those in search of orientation. For film histories constructed around the 'masterpieces' of film art, this critical turn would seem to have marked the beginning of the end.

But masterpieces aside, the history of film's histories seems to have its own 'canon' of favoured developments, anecdotes and arguments, elements which have regularly returned in each generation's recasting of its position vis-à-vis the past. The process of film's historical construction is striking as much for the consistency of the 'facts' or 'myths' (depending upon one's historiographic inclination) referred to, as for the ritualistic critique of the meanings derived from those referents by previous generations. Assertions of inadequate research or inaccurate focus have routinely been seized upon as motives for dismissing past interpretations, yet until recently such critiques have themselves been driven by changes in interpretation rather than being based upon new data.

Although this obviously oversimplifies the case, it allows us to consider the community

of film scholars in something like the terms laid out by Hobsbawm and Ranger, and by Benedict Anderson, in their work on nation, tradition and identity. Developmental myths have helped to define the boundaries of our discipline, keeping our eyes on some issues while relegating others to the margins. The long fixation with an idealised notion of archival print integrity, and the concomitant neglect of such conditions of exhibition as colour and sound;[15] the search for the moving image's technological lineage in terms of the camera obscura and laterna magica, and the suppression of the role of coincident developments in television and scientific apparati; and the tendency to perceive film history first and foremost as a textual problematic and only secondarily as a set of culturally bound practices, have all contributed a stabilising influence to an otherwise vexed notion of disciplinarity. Pre- and early cinema have assumed important roles in our foundational myth, the place where we recall the developments which gave us a cultural practice, a research object, a *raison d'être*.

If one looks to the earliest histories of the film medium, at the elements of what function as developmental genealogies, one cannot but be struck by the high degree of correspondence with what appears in today's textbooks. David Hulfish's 1909 *The Motion Picture: Its Theater and Its Making*, for example, draws upon even earlier instances of the same argument, tracing the role of the camera obscura, the zoetrope, Muybridge's work for Leland Stanford, Edison's Kinetoscope, etc. in the medium's development. Although one could certainly argue that the continuity of these references with those of the present reflects an intersubjectively-confirmed core of agreed upon events, there may also be reasons to challenge this easy assumption.

'Facts', assumptions, language, technological referents and, of course, national myths all provide the basic warp upon which each passing generation's interpretative scheme is woven. But, to extend this metaphor, just as the spaces between the warp and weave contribute to the final texture, so too do the recurrent absences in the stuff of which cinema history is constructed. The problem is that some of the most recurrent elements also appear to be somewhat unreliable – an attribute that admittedly has little to do with the consensual function of these recurrences, but everything to do with our vision of history.

A basis for revision? Re-considering technologies

On the morning of 1 July 1913, a transmitter located in the Eiffel Tower sent the first time signal around the world. Global simultaneity, or something close to it, was finally achieved. This moment, probed by Stephen Kern for its implications, served as the culmination of a series of developments such as the telegraph and international agreements on standard time which gave form to a culturally distinctive conception of time.[16] The Eiffel Tower's role in the new culture of simultaneity inspired poets, painters and the public, but curiously, the very idea of time celebrated in this use of Eiffel's construction had already been undermined in 1905 by Einstein's special theory of relativity. Regardless of scientific perceptions, however, popular and industrial culture seemed to embrace a notion of speed whose logical culmination, in the communications sector at any rate, was the ever-diminishing interval between transmission and reception. Given the rather deeply ingrained Western tendency to construct linear developmental narratives, it is not surprising that the histories of communication technologies or today's advance press for new media systems have privileged a particular notion of progress. From such a perspective, it seems self-evident that a temporally disjunctive storage medium (film) would inevitably give way to a medium of temporal simultaneity (television) and, in turn, that new technologies of simultaneity (enhanced by individual address capacities) such as the internet will eventually assume centre stage.

Despite the familiar progression of events chronicled in most media histories, however, there is good reason to reconsider the fabric of cultural expectations and technological developments so central to this century's notion of media, and in the case of this essay, particularly the moving image media. By examining the cultural imagination, technological capacity, and cinema's own early production practices, it might be argued that television rather than film occupied a central

place on the nineteenth-century horizon of expectations. This repositioning addresses emergent cinema's cultural position, raises some questions regarding cinema and television's construction of viewing subjects as well as into contemporary debates over 'new media' as a set of technologies, discourses and cultural practices.

Examining the developmental histories of old media technologies when they were new, as Carolyn Marvin has argued, offers a powerful if overlooked means to evaluate elements of continuity in our own endeavours.[17] The history of 'old media' developments, if freed from the teleological determinism which so often accompanies retrospective considerations, can provide a surprisingly diverse range of alternative concepts and consequences. While these are most often made up of dead ends and spoiled dreams, the spectrum of available alternatives to a particular media technology both as a context and as an object lesson provides insights in the process of technological and cultural assimilation. Developmental patterns are not so interesting for their sometimes uncanny sense of anticipation as for what they reveal about the structures of innovation, implementation and cultural integration, all issues covered under the rubric of the social history of technology.

The last few years have seen a number of different attempts to consider and conceptualise developing (media) technology, the efforts of Bijker, Kittler, Zielinski, Winston, Douglas, Marvin and others among them. These scholars have offered wide-ranging constructions of media/technological history and developmental theories which have helped to stimulate much needed reflection and problematise easy assumptions about our very definition of media systems. As historians engaged in the construction of theory, their efforts have been directed towards providing interpretative (and sometimes polemical) frameworks that have been accepted, contested, or modified, but that have also tended to overshadow the nuances and complexities of the developments themselves. A rather different approach has been in evidence among researchers of early cinema over the past twenty years. In this case, a field of study which tends to focus on the excavation of stylistic possibility and institutional history extended its efforts to the consideration of the technological possibilities and alternatives that preceded and initially competed with the medium of projected film. This project was itself part of a larger move to construct a detailed social history of media production, distribution, exhibition and reception. The resulting research has tended among other things to document the micro-history of long-overlooked technological developments, the back-stories of their success or failure, and the complexities and contradictions of popular exhibition and reception, providing a rich database for subsequent analysis.[18] These two approaches – historically-informed theory building and micro-historical excavation – stand as two axes helping to orient consideration of the existing field. And although efforts continue along both of these directions, it seems increasingly clear that we can look forward to an invigoration of research thanks to synthetic work now beginning to appear from the centre of the field.

Re-reading liveness

As previously mentioned, histories of the film medium have ritualistically included reference to the camera obscura, giving cinema a respectably old genealogical trajectory that stretches back at least to Giovanni Battista della Porta's treatise on the subject. As an authenticating strategy, the camera obscura argument has some obvious benefits for cinema, but it also brings with it some difficulties. The camera obscura and implicitly those technologies such as cinema (television and even virtual reality) discursively dependent upon it have been deployed as part of two very different arguments. On the one hand, they offer evidence of a teleological progression of ever-more 'accurate' or 'natural' systems of representation. On the other, they are seen as apparati of social and political control, disciplining and positioning viewers through an ideology of representation. The respectively conservative and radical agendas lurking behind these two deployments are easy enough to see (particularly in the debates over new media), but perhaps this bifurcated view is a bit preliminary, at least with regard to film.

While one can appreciate the attempt to locate the cinematic apparatus and viewing subject within a particular tradition, such an approach also masks significant differences in representational systems. The tradition of the camera obscura is predicated upon a spatially fixed and unified subject position and upon such elements as simultaneity, spatial proximity and even the optical contiguity of the world viewed with the viewing subject. Cinema, by contrast, is capable of activating multiple subject positions and points of view, and is by definition recorded (non-simultaneous) and thus freed from such constraints as 'proximity' and 'contiguity'. But if film practice represents a break from the camera obscura tradition, does seeing television as a 'pre-cinematic' discourse offer any additional clues into the range of available ways of seeing within which cinema positioned itself? Is television in fact a more appropriate inheritor of the camera obscura tradition, and if so, does this shed any light on cinema's detour from television? Or is the televisual itself a radical reconfiguration of this tradition and a sine qua non for understanding the emergence of the modern viewing subject and the viewing discourses of which media from cinema to virtual reality are but different expressions?

The argument, to which we will return soon, depends on a definition of television that has more to do with an ideal definition of the medium, one discursively related to the philosophy of Parmenides, than the one most of us actually have an opportunity to view on a regular basis. It depends on an idea of television relentlessly asserted (but rarely provided) by CNN, an idea shared in by millions during the World Cup or the latest media event/disaster: it depends upon simultaneity. Obviously videotape becomes oxymoronic from such a view of television (although oxymoronic or not, it is embedded in social practice, albeit for different reasons than those deployed for the cinematic), so perhaps the word televisual will help to keep the emphasis on that quality of simultaneity repeatedly emphasised by early writers on the television medium but which remains more potential than actual.

Writing in a time of tremendous advance in electro-mechanical technologies, Albert Robida attempted to chart the course of the next hundred years in his 1883 book, *Le vingtième siècle*.[19] Along with other literary visionaries such as Jules Verne and inventors such as Charles Francis Jenkins and Paul Nipkow (both nineteenth-century developers of television), Robida's sensitivity to the potential of the conceptual and technological status quo appears in retrospect not only profound, but serves as a powerful reminder of just how much of the future is embedded in our past. Robida's description of the 'telephonoscope', for example, detailed an audio-visual technology that could bring distant entertainment into the living room, that could serve as a means of surveillance, and that could serve the mission of 'la suppression de l'absence' by facilitating real-time face-to-face communication over vast distances. Robida's prediction of television, like those of some of his contemporaries, offers a striking instance of technological anticipation, but it also speaks to the long history of ideas, urges and attempts which infuse our latest understanding of 'new' media.

The lesson is a simple one. Technological capacity requires the cultural imagination in order to emerge as cultural practice, and the last quarter of the nineteenth century was seething with possibilities and limits which eventually gave conceptual form to film by de facto defining the televisual.

The televisual, as a technological construction, was born with the invention of the telephone in 1876. Although the telegraph before it had transformed Western notions of time and space, the telephone offered something even more radical – the live transmission of voice, the opportunity to direct point-to-point encounters with the simultaneous. Within one year of the telephone's invention, writers took the idea of directable simultaneity and replaced the grain of the voice with the grain of image. The wedding of telephone and photography and the consequent full-blown descriptions of live 'television' transmissions took many forms. In June 1877, *L'année scientifique et industrielle* included a description of the 'telectroscope', a device attributed to Alexander Graham Bell that sent live images over a distance. Within two years of the telephone's invention, a now famous cartoon ap-

Fig. 1. Almanac for 1879, Punch *75, 9 December 1878.*

peared in *Punch* which showed a girl in Ceylon speaking with her parents in London by way of a wide-screen 'electric camera-obscura' attributed to Edison and a telephone (Fig. 1).[20] By the end of the century, Albert Robida would provide his detailed vision of television as an apparatus of simultaneity capable of entertainment, communication and surveillance (Fig. 2). Through these fantasised expressive efforts, an idea of simultaneity already defined and experienced through the telephone quickly took hold in the popular imagination as a quality that could be extended in image.

The invention of the phonograph, the ability to fix and record the ephemeral quality of sound, followed the telephone by one year. And like the telephone, the 'liveness' of the phonograph sparked the imagination of those interested in extending the quality to images. In 1878, for example, Wordsworth Donisthorpe wrote to *Nature* describing a sound motion picture device – 8 frames per second on a flexible, spooled ribbon with phonographic accompaniment. The near coincidence of 'live' telephonic (simultaneous) and 'live' phonographic (recorded) technologies and their related imaginary schemes make the discussion of nineteenth-century notions of 'liveness' extremely difficult. In cinema history, the romanticised recurrence of the 'Lumière effect' – an impression of reality so strong that viewers allegedly sought cover from the filmed image of an oncoming train – finds at least discursive support in the 'liveness' asserted in the names and terms associated with the early film industry such as vitascope and window on the world. Such perceptions of 'liveness', as with the phonograph, were central to the marketing success and probably even audience pleasures of early cinema. And while it is impossible to reconstruct a full sense of late nineteenth-century 'liveness', what nevertheless remains clear is that 'simultaneity' was both invoked by it and helps to distinguish its different forms. That is to say, both the telephone and the phonograph were hailed as 'live', but only one offered access to simultaneity. The experience of simultaneity over distance was relatively pervasive at the moment of cinema's intro-

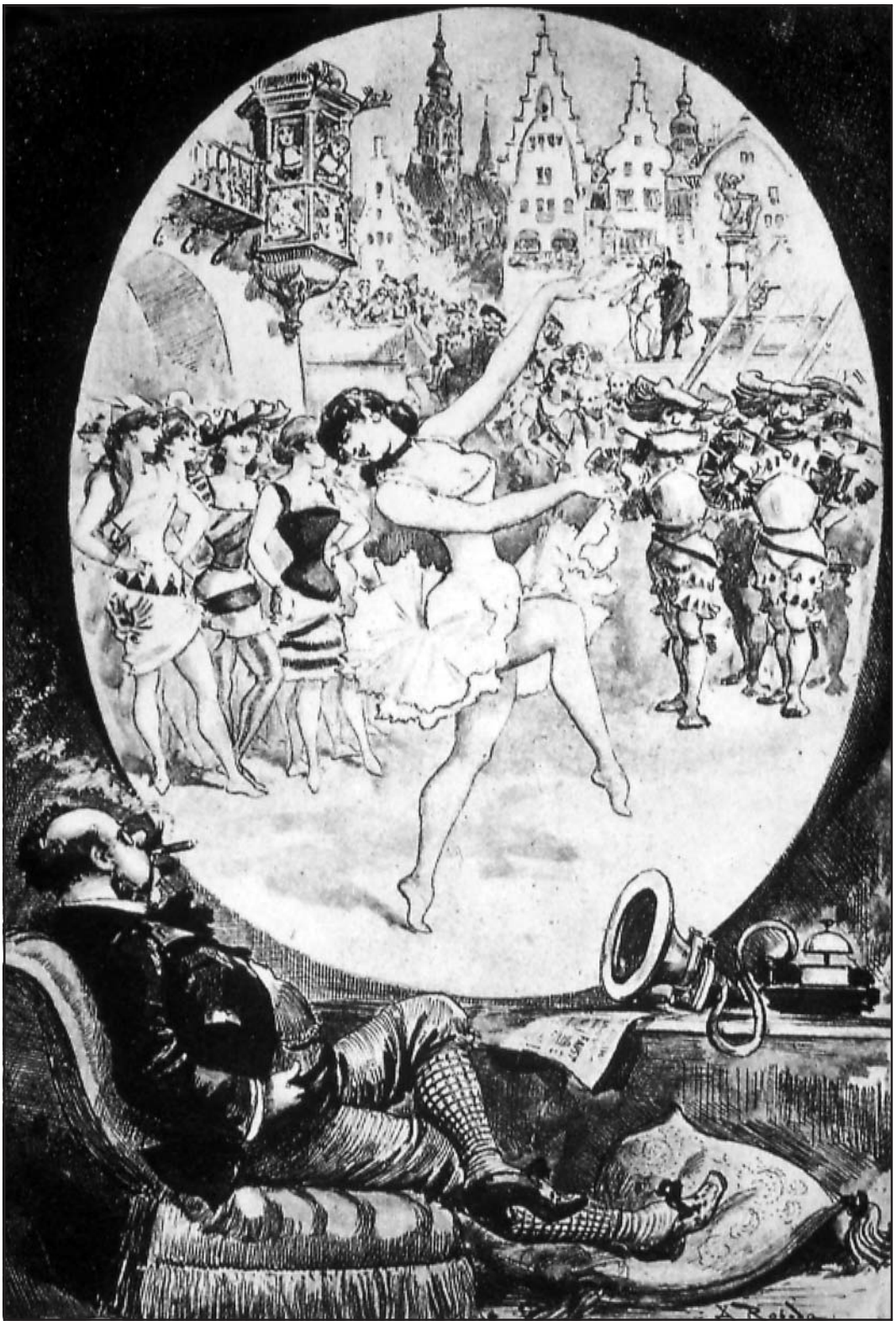

Fig. 2. From Albert Robida, Le Vingtième Siècle *(Paris: G. Decaux, 1883).*

duction (in the US, close to 1 million telephones were in place by 1895), and the extension of simultaneity to moving images, to the televisual, was fully imagined and positioned in popular media. Cinema historians have tended to flatten the discourse of liveness, some even using the Lumière anecdote to assert a sense of simultaneity. And, indeed, for viewers then as now, perhaps the illusion of simultaneity was acceptable (as well as cheaper and more reliable). But a look at broader cultural practices, at the telephone, at the ideas sparked by electricity, at the fantasies of new media, all suggest that simultaneity stood as a powerful anticipation which cinema could simulate but never deliver.

Thus far we have dwelt on the intermedial and the imaginary as sites for the discussion of simultaneity and the construction of a new viewing or listening subject. Obviously many other realms – political, economic, social and so on – offer insights into this process; but perhaps briefly exploring the point through technological history, through inventions and patents, through the world of practice, will help to solidify the discourse of the imaginary. Vis-à-vis television history, such a discussion has the added advantage of calling attention to a long and largely neglected tradition of representational efforts distinct from those of cinema (with which it is too often conflated). If the televisual as an imagined technology enjoyed a period of rich development shortly after the invention of the telephone, certainly its material base (like the telephone's which it held in common) also enjoyed a long prehistory. My point is not to trace out a detailed technological genealogy, but rather to suggest a set of developments which parallel those usually invoked in the history of cinema. For example, the milestones in photography so central to cinema's development – Daguerre and Henry Fox Talbot's experiments in 1839 – might be paralleled to Samuel Morse's 1837 demonstrations of an electronic telegraph; Renaud's projection model praxinoscope or Muybridge's zoopraxiscope, both from around 1879, might be paralleled to Bell's voice telephone of 1876. More importantly, however, the patents for what would appear as the first working television systems were filed in 1884. Paul Nipkow's patent for the *elektrisches teleskop*, the so-called 'Nipkow disk', provided the heart of mechanical television systems into the early 1940s. Nipkow's system permitted the instantaneous 'dissection' of images, their transmission as electrical signals, and their 'reassembly'. By 1889, Lazare Weiller's phoroscope proved capable of much the same task, except that in place of a spinning disk, Weiller used a revolving drum made of angled mirrors. With an almost symbolic prescience, nearly one hundred years ago as projected moving pictures first graced the screen, Charles Frances Jenkins designed his phantascope – a name that included two devices: one a moving picture system co-designed with Thomas Armat, and the other a television system that promised, but so far as we know, failed, to transmit simple shapes.

The point is that television, historically conceived as a medium of simultaneous transmission, found both a place in late nineteenth-century popular imagination and a place in the patent register. The basic conceptual problems of the technology had been resolved, and an imagined and technologically possible way of seeing at a distance was fully anticipated and articulated. Why then the initial success of film and not television? It is, of course, possible that for many viewers, simultaneity was simply not important, regardless of what larger cultural practices might suggest. But, as the subsequent history of attempts to establish a reliable, mass-producible and affordable apparatus demonstrated, there were also very real physical reasons.[21] The space between conceptual solution and technological deployment was a profound one. Slow developments in the electronics, technological and manufacturing infrastructure, limited broadcast spectrum availability and the consequent struggles to standardise and control emissions, the consequent necessity for broadcast centralisation, and even such basic requirements as widespread electrification (not 'universal' in the US until the 1930s), all point to the reasons for television's long delay. The film medium, by contrast, benefited from rudimentary mechanical technology, superior and stable image quality, and low investment requirements, all assuring easy and decentralised proliferation.

Technologies of simultaneity

An unusual experiment filled the air in Berlin during the summer of 1930. Siemens' engineers tested a gigantic loudspeaker mounted in Berlin's version of the Eiffel Tower, the funkturm, with results that could be heard as far away as Wannsee; indeed, speech and music could be clearly heard within in a 60-degree range some twenty kilometres away. This massive device weighed several tons and was part of a product line that included loudspeakers designed for installation underground and in street-corner kiosks. According to their developers, these loudspeakers could literally be used to cover the country with sound, and they promised to unify people from distant locations through shared participation in live sports, political and commercial events. The attempts of companies such as Siemens and Telefunken actively to pursue the development of ever-larger loudspeakers and to deploy them across the nation were consistent with their interest in other technologies, in particular, in radio and television. Besides being motivated by a desire for profits, these technologies were driven by a remarkable awareness of the media's ability to redefine the public sphere, both extending the notion of event and the notion of human presence. As such, these technologies were the direct inheritor of the same nineteenth-century imagination which ultimately defined the film medium through its limits. In this case, however, the dream of simultaneity was technologically fulfilled.

This incident from a relatively early moment in the history of acoustical amplification complicates the more familiar narratives of sound technology in the service of the recorded media of film and the phonograph. But the conjunction of loudspeakers, radio and television in the German electronics industry of the late 1920s and early 1930s reveals something more, namely the interworkings among various media technologies in pursuit of a particular goal: the attempt to extend being beyond the site of its physical embodiment, to extend real-time participation in distant events, and in the German case, to redefine the *Volkskörper*.[22] This goal can be seen in any number of examples. From the late 1920s into the late 1930s German broadcasting authorities urged both the electronics industry and consumers to put 'a radio in every house' by co-ordinating the design and pricing of the 'people's receiver'. The campaign was a massive success with the public, and it encouraged broadcasting journalists and engineers alike to theorise the potentials and implications of a public defined by a technology. Before 1933, writers from a variety of ideological persuasions charted the utopian possibilities of the new technology. But the 1933 'co-ordination' of broadcasting by the National Socialist state resulted in a more strictly defined sense of how radio would be used to forge the new spirit of the nation, calling to mind Jeffrey Herf's notion of 'reactionary modernism'.

Early German television offers perhaps the most far-reaching instance of the nineteenth-century ideas of simultaneity. Daily public television broadcasting began in March 1935 and continued until late 1944, but despite impressive technological developments, it remained a medium with a relatively small public. One of the reasons for television's slow start, despite its technological lead, had to do with the definition of the medium. Caught among warring political and industrial constituencies, television found itself the subject of curious and heated debates over its media identity. Television was generally seen as deriving from some existing medium, existing as a variation rather than a self-standing medium. Was television the logical culmination of radio? in which case it could broadcast a mix of live and stored programming and transmit to the atomised domestic setting of the individual home. Was it more like cinema? in which case it could rely upon filmed material and exhibit it to collective audiences in television theatres. Or was it more closely related to the telephone? in which case it could be used to enhance point-to-point communication and information transfer. All three visions vied for domination and all three found material form. Most of those people who saw television in Berlin visited one of the city's thirty or so television halls (most seating forty people, and one seating 800). There they saw both live programming such as the 1936 Olympic Games and live television drama, as well as filmed programming, such as shortened versions of feature films

and news features. Plans were in place to mass produce television receivers for home use, and indeed the orders for the first 10,000 public sets were issued just as war was declared. Although home television remained the privilege of a select group of critics and functionaries, it was heavily promoted as a home commodity. Television also took form as part of the communication infrastructure. By the mid-1930s, a televisiontelephone system linked Berlin with Hamburg, Leipzig, Cologne and Nürnberg, giving form to yet another vision of the medium.[23]

A debate raged around the issue of simultaneity and the need to distinguish television's capacity for simultaneity from cinema's necessary rupturing of time. Especially after the start of war, proponents of simultaneity saw their case literalised through the development of television guidance systems for rockets and torpedoes. Produced in quiet co-operation with several American-based multi-national electronic firms, the guidance systems permitted a pilot to 'see' his target from the perspective of the missile, guiding it to successful contact. At the war's end, Allied intelligence found one factory that was producing 300 miniature cameras a month with semi-skilled slave labour for the still-experimental television missile guidance programme. The idea of television as the technological fulfilment of the camera obscura takes on sinister dimensions with this little-known development, dimensions which Paul Virilio has outlined in his analysis of vision and simulation in the conduct of war.

Perhaps the most revealing insight into how the medium of television would reposition if not eliminate film appeared in a top-secret report produced by the Post Ministry in 1943. The Post Ministry had long been engaged in a bitter conflict with the Propaganda Ministry, a conflict based on the culture clash between career civil servants (the Post) and NSDAP hacks (Propaganda). With the Post responsible for television's apparatus and technology-intensive live broadcasts, and Propaganda responsible for programming, disputes were inevitable over everything from time allocation to the sharing of radio licence fees. Late in the war, however, senior officials at the Post Ministry drew up a secret plan for post-victory Europe that they felt would render the Propaganda Ministry redundant. The plan called for a live cable television news network to connect Greater Germany and the occupied territories. Round-the-clock live television news, the Post's domain after all, would simply do away with the need for premeditated propaganda and filmed programming. The live connection between the leadership and its followers, the extension of nation through shared event, would constitute the neural network linking the new Germany, constructing the new *Volkskörper* anticipated in the loudspeaker experiments of the late 1920s. Thanks to such diverse factors as German engineering education, the efforts of philosophers from Junger, to Benjamin, to Heidegger, and the massive state-stimulated electronics industry, Germany offers a particularly good example of the interworkings of media systems in pursuit both of common goals and autonomy, a pursuit with direct implications for media identity and cultural practice.

Implications

These instances drawn from film's pre-history and television broadcasting's first years are but a few of the many cases where the struggle to define or extend media's technological capacities and cultural practices have resulted in tangible action. The histories of both media are rich with such incidents, attesting to the process of ongoing redefinition so much a part of the media landscape. But despite the live viewing of Diana Princess of Wales' funeral by some two billion world-wide viewers and the World Cup final, television has steadily been shifting away from an engagement with the simultaneous. The explosion of channels available with cable or satellite has turned television into a very different sort of time machine – one which permits instant access to random points in the televised (and filmed) past. Today's television public equipped with remote control tuning can zap through hundreds of programmes, viewing across news, information and entertainment programming generated anytime in the past 100 years. Television's present, with increasingly rare exceptions like Diana's funeral, has been disconnected from its real-world referent. But

interest in simultaneity seems not to have disappeared, rather, it has simply been displaced. The increasing presence of near-simultaneous events on the internet such as web-cam sites is but one example. Twenty-four hour access to the lion cage at the Lincoln Park Zoo, or to the exterior of the Parliament Building in Ottawa, Canada, or to a coffee pot in a mathematics department at Cambridge University, or any number of mundane locations feeds through the internet in static images refreshed every few seconds. The tension between the static and the immediate is, for this viewer anyway, almost unbearable, but it also offers a hint of an internet application which may well have a future.

What do we gain from considering an alternate set of referents for media's developmental history? What are the benefits of, for example, seeing film within a cultural framework prepared for the appearance of television? By deepening our understanding of the late nineteenth-century horizon of expectations, we can certainly better locate the strengths, liabilities and possibilities of a medium we have far too often 'flattened' from a presentist viewpoint. Our understanding of cinema as a cultural practice can only benefit from an understanding of alternate and competing visual representation systems, and from a more nuanced appreciation of widely-used descriptors such as 'liveness'. For example, the predominance of non-fiction film subjects from 1895 to ca. 1903–06 together with descriptors of the film medium as 'a window on the world' or 'the mirror of nature' suggest a sense of simultaneity with the subject viewed and the external world. Newspaper reports, cartoons and even film subjects asserted that some patrons confused screen events with real events. While this has usually been read as evidence of visual realism, such anecdotes could also be read as accenting the perceived simultaneity or 'presence' of representation and reality. This reading is underscored by the term used to describe the fictional narrative subjects which increasingly dominated the screen after 1903–06: 'canned drama'. The notion of storage, of temporal dislocation, is central to this term, despite the frequent maintenance of realist representational strategies. Although admittedly speculative, such perspectives are potentially useful for the understanding of early production practices (and possible reception patterns), as well as for re-evaluating a strain of utopian discourse that runs through the writings of some early film and radio theorists.

Such an approach underscores the need (for those interested in television) to extend film's recent historiographic break with teleologically-driven history – and the consequent 'rediscovery' of historical possibility so evident in the continuing work with early cinema – to television. In this work, technological and cultural dead-ends are every bit as interesting as the patterns of success which have tended to dominate media history. In this sense, film has enjoyed a relatively developed – if uneven – historical exploration which the television medium largely lacks. For a number of reasons ranging from the medium's ephemeral nature to its institutionalisation within a social science paradigm, the technological and representational traditions of television remain a long overdue research area. As the examples drawn from Germany's television history indicate, insights into the construction of nation, public and event await those researchers who are willing to untangle the broadcast media networks.

Repositioning film within a field of televisual expectation helps to make clear the extent of the break with the camera obscura tradition, at least as regards cinematic practice. While one can appreciate the long history of attempts to locate the cinematic apparatus and viewing subject within this tradition, as we have seen, such an approach also hides significant differences in representational systems.[24] Television, rooted in simultaneity, in a technologically enabled sense of proximity and contiguity, might seem to fulfil precisely those criteria missing in cinema.[25]

The re-positioning of the camera obscura has direct implications for the construction of the historical cinematic viewer, particularly in the context of an actively articulated alternative. A 're-reading' of early cinema discourse (a task that remains to be done) might well reveal less continuity with the model of the hidden and controlling unified subject constructed by the camera obscura than we have imagined, a revelation with obvious conse-

quences for our understanding of representational history.

Perhaps it is time to begin more serious consideration of traditions other than that of the camera obscura, traditions having centrally to do with storage and reconstruction (memory theory) and with a mediated and more fully modern notion of the subject. But lest we simply switch television with film, there are also good reasons to qualify television's appropriateness as inheritor of the camera obscura tradition, chief among them the medium's tendency to rely upon stored (videotaped) material and its potential for fragmenting viewing position by cutting among multiple spatial positions within real (simultaneous) time. Viewed from this perspective, both television and film break in significant and different ways from a representational tradition that has lurked behind a substantial body of theorisation, suggesting that much work remains to be done. Moreover, it appears that a candidate has appeared which can legitimately take up the historical linkage with the camera obscura: the internet web-cam. But this development, with all of its possibilities, must await resolution of the stasis-liveness problem of the web-cam's low image-refresh rate. But even assuming technological improvement, the problem of industrialising and packaging directable liveness may prove to be a far more serious stumbling block. Perhaps, too, there is something to be learned from what might be called the law of diminishing resolution, in which a hierarchy of phenomenological density seems to correlate with the shift from textual specificity (film) to low-resolution connectedness (web-cams). From this perspective, different sets of criteria may account for the deployment and categorisation of these media beyond the temporal dimension which this essay has privileged.

Cinema's successful emergence and television's long delay as a mass medium – this despite television's presence as both popular dream and technological possibility – would seem to raise some significant questions to the current debates over 'new media'. What is the role of the imaginary, of expectation, in shaping technological capacity into cultural practice? How might we think about the displacement of expectation by the easy availability of 'inferior' alternatives? How do simultaneous, unified-viewing position media such as virtual reality relate to the distinctions offered by film and television particularly in the construction of vision and subject? As we witness a moment in media history not so dissimilar from the late nineteenth century in terms of the mix of discursive anticipation and technological possibility, perhaps the developments of the past will help to spare us unnecessary detours in our future, but more to the point, offer us new ways of seeing our present.

Notes

1. The reference here is to the 1978 FIAF conference in Brighton which triggered a reappraisal of film historical assumptions and, eventually, methods.
2. Miriam Hansen, *Babel and Babylon: Spectatorship in American Silent Film* (Cambridge, MA: Harvard University Press, 1991); William Uricchio and Roberta Pearson, *Reframing Culture: The Case of the Vitagraph Quality Films* (Princeton: Princeton University Press, 1993).
3. Exceptions include such diverse approaches as Brian Winston, *Technologies of Seeing: Photography, Cinematography and Television* (London: British Film Institute, 1996); Armand Mattelart, *The Invention of Communication* (Minneapolis: University of Minnesota Press, 1996); Charles Musser, *Before the Nickelodeon: Edwin S. Porter and the Edison Manufacturing Company* (Berkeley, Los Angeles and London: University of California Press, 1991); and Siegfried Zielinski, *Audiovisionen: Kino und Fernsehen als Zwischenspiele in der Geschichte* (Reinbek bei Hamburg: Rowohlt, 1989).
4. Georg Simmel's 1903 article 'The Metropolis and Mental Life' seems emblematic of period perceptions of modernity's impact. See also Ben Singer, 'Modernity, Hyperstimulus, and the Rise of Popular Sensationalism', in Leo Charney and Vanessa R. Schwartz (eds.), *Cinema and the Invention of Modern Life* (Berkeley, Los Angeles and London: University of California Press, 1995), 72–99; and Stephen Kern, *The Culture of Time and Space 1880–1918* (Cambridge, MA: Harvard University Press, 1983).
5. I do not mean to argue here for an essential fact/fiction distinction nor even a narrative/non-narrative

distinction for the *actualité* as a category. However, my examples draw upon non-narrative instances (unless one defines narrative in terms of simple chronology or broadly in terms of reception). The distinction will return in sharper form when discussing especially live transmissions. For a fuller discussion of the *actualité*, see *Kintop* 6 (1997) and for its relation to time, see in the same number, William Uricchio, 'Aktualitaten als Bilder der Zeit': 43–50.

6. Although cinematic representations of space and time are both experienced within a real-time and real-space reference system, the experience of viewing cinematic time is arguably less mediated than the experience of viewing distant spaces since temporal representations often require a fourth dimension for their articulation whereas three dimensional spaces are by convention represented in two dimensions. This difference complicates both the representation and reception of cinematic temporality.
7. Lynne Kirby, *Parallel Tracks: The Railroad and Silent Cinema* (Durham, NC: Duke University Press, 1997); Wolfgang Schivelbusch, *The Railway Journey: Trains and Train Travel in the 19th Century* (New York: Urizen Books, 1979). Kirby's book includes a wide-ranging discussion of train-mounted actualities.
8. See Tom Gunning, '"The Whole World within Reach": Travel Images without Borders', in Raymond Cosandey and François Albera (eds.), *Cinéma sans frontières 1896*–1918 / *Cinema Across Borders* (Laussanne: Editions Payot and Qúebec: Nuit Blanche Editeur, 1995), 21–36.
9. This, according to Nicholas Hiley. See Daan Hertogs and Nico de Klerk (eds.), *Non-Fiction Film From the Teens* (Amsterdam: Nederlands Filmmuseum/BFI, 1994), 26. Such attempts, while not common, were nevertheless persistent from film's start, as Lumière's practice of filming and exhibiting on the same day suggests. Charles Musser describes how in 1899 a reviewer for the *New York Clipper*, upon seeing film images shot the same day, seized upon this sort of development as the essence of the medium: 'the secret of Moving Pictures consists in their TIMELINESS. Without that feature, such an exhibition would surely fail.' Charles Musser, *The Emergence of Cinema: The American Screen to 1907* (New York: Scribner's, 1990), 275.
10. Kern, *The Culture of Time and Space*, 118.
11. See, for example, Stephen Bottomore's collection of cartoon responses to the early film medium, *I Want to See this Annie Mattygraph: A Cartoon History of the Coming of the Movies* (Pordenone: Giornate del Cinema Muto, 1995), 44–53.
12. The cinéorama may indeed have been more of a discursive gesture than a film experience. Richard Abel, based on Jean-Jacques Meusy, reports that it never actually opened. *The Cine Goes to Town: French Cinema 1896–1914* (Berkeley, Los Angeles and London: University of California Press 1995), 14.
13. Kern, *The Culture of Time and Space*, 68.
14. Henri Bergson, *Creative Evolution* (1907; rpt. New York: The Modern Library, 1944), 335.
15. The situation is changing. Recent initiatives by the Nederlands Film Museum, Bologna's Cinema Retrivato, and the Pordenone festival have stimulated new interest and research into colour, and preparations for a forthcoming NFM summer workshop on sound and the individual efforts of scholars such as Karel Dibbets and Rick Altman are having a parallel influence on sound. These efforts may broadly be seen within the context of the shift from the text as a formal entity to the text as social practice, although obviously formal concerns continue to play a role.
16. Kern, *The Culture of Time and Space*, 14.
17. For an engaging and anecdote packed discussion of the introduction of electricity and the telephone, see Carolyn Marvin, *When Old Technologies Were New: Thinking About Communications in the Late Nineteenth Century* (New York: Oxford University Press, 1988).
18. Among the diverse contributions, Albert Abramson, *The History of Television, 1880–1941* (London: McFarland, 1987); Hermann Hecht, in Ann Hecht (ed.), *Pre-Cinema History: An Encyclopaedia and Annotated Bibliography of the Moving Image Before 1896* (London: Bowker Saur, 1993); Deac Rossell, 'A Chronology of Cinema, 1889–1896', *Film History* 7: 2; George Shires, *Early Television: A Bibliographic Guide to 1940* (London: Garland Publishing, Inc., 1997) and Winston, *Technologies of Seeing*.
19. Albert Robida, *Le vingtième siècle* (Paris: G. Decaux, 1883).
20. George Dumaurier, 'Edison's Telephonoscope (transmits light as well as sound)', Almanac for 1879, *Punch* 75 (9 December 1878).

21. See Abramson and for a close look at the German situation before 1945, see William Uricchio, *Die Anfange des deutschen Fernsehens* (Tübingen, 1991).
22. Simultaneity, as Georg Simmel argued, can be seen as a defining characteristic of modernity, making it a singularly appropriate concept to explore in the case of media. Simmel described modernity as 'an eternal present' and as 'preoccupied with simultaneity'. Critics such as Adorno and Kracauer were quick to seize upon the dangers of this view, seeing it as idealist and ahistorical, but this does not diminish the power of Simmel's insight into one of the organising principles of modern life.
23. Jonathan Crary, for one, has offered an interesting exploration of the implications of making this distinction between cinema as a technology dependent upon the camera obscura and cinema as a cultural practice involved in the construction of the modern viewing subject. Obviously we differ fundamentally on the relevance of the camera obscura to discussions of cinema – a difference with wide-ranging implications – but his discussion offers an excellent summary of the dominant theoretical position. Jonathan Crary, *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century* (Cambridge, MA: MIT Press, 1990).
24. For a provocative consideration of the implications of this argument for the construction of a new subject, see Dominik Schrange, in *Technokratische Subjektkonstruktionen Psychotechnik un Radio als subjektivitaetsgenerierende Apparaturen*, forthcoming.
25. Although from a more presentist perspective, Richard Dienst pursues some of these implications with regard to the televisual in his *Still Life in Real Time: Theory After Television* (Durham, NC: Duke University Press, 1994).