PART I

CINEMA IN THE REALM OF THE DIGITAL: FOUNDATIONAL APPROACHES
CHAPTER 2

DIGITAL CINEMA: CONVERGENCE OR CONTRADICTION?

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Among the changes that the combination of computer and telephony has brought to life in the twenty-first century, the innovations in sound reproduction and moving image technology are probably not the most decisive. Yet as the information revolution has gathered unprecedented momentum, transforming the way we communicate, create, work, are governed, and entertain ourselves, it is television and the internet that have become the most visible indicators of a qualitative leap. Television, once a state monopoly in most parts of the world, or (as in the United States) a very self-selected club of multinational tycoon-led corporations, has—in its deregulated, commercial form—become a source of sounds, text, and images as automatic, pervasive, and taken-for-granted as switching on the electric current or turning on the water faucet. Even greater ubiquity, accessibility, and “invisibility” await the internet. During a little more than two decades, it has emerged as an entirely new medium, combining the functions of newspaper, post office, book publisher, and library with the services of radio, television, telephony—not to mention the fact that the World Wide Web is also the largest marketplace and shopping mall in human history. These hybrid knowledge-communication-information media, still competing with each other and yet set also on a convergence course, are both cause and effect: they respond to and thereby also drive—via seemingly endless and ever-expanding feedback loops—shifts in human interaction and perception, in consciousness and mind–body links, as well as imposing themselves in myriad forms on social cohesion and asocial solipsism, health and welfare, crime and warfare, political decision making and interpersonal communication. These, in turn, imply a technologically mediated or automatically mediatized contact with “reality” as our primary experience of the world, making television and the internet ever more invisible interfaces for the ways that members of “developed” societies understand themselves as living both
locally and globally, but also in another dimension altogether—that of the virtual, as one
of the dimensions of the actual.

In the process, cinema—hitherto television’s “other”—has been overshadowed, if
not altogether eclipsed as a subject of public concern or debate, indeed, as a “medium.”
And yet, cinema has always served as a metaphor for matters of life (and death) that
extend beyond individual films and movie theatres into the realms of identity, subjectiv-
ity, and our “being-in-the-world.” André Bazin called the cinema “the ancient dream of
mankind,” desiring its double, its mirror: the creation of an imaginary self alongside the
physical self, and a way of cheating death, by preserving that other self: cinema as the art
of embalming “time” along with rescuing the body: the “Mummy Complex.” Siegfried
Kracauer spoke of it as the “redemption of physical reality,” and Walter Benjamin
regarded film as the very medium destined to train our senses and make us fit for moder-
nity. Today, many see the moving image as our most precious (and endangered) histori-
cal heritage, a unique “archive” of life over the past 150 years. Some, like Lev Manovich,
have argued that cinema is nothing less than the template for our cultural understanding
of the new (digital) media, and, for still others, among them Gilles Deleuze, the cinema
constitutes a material-mental organism in its own right, a new and vibrant articulation
of matter, energy, and information, and thus a “thing” that “thinks,” which only philoso-
phy can help us understand. In its relatively brief history of just over a hundred years,
the “cinema” has become more than the sum of the films made for public projection. Yet
“the movies” are also less than the sum of the fears and fantasies—about the animate and
inanimate, the biological and the technological, the living and the dead—that contem-
porary culture has invested in the moving image. This is why it makes sense to speak of
new ontologies required by what Deleuze, in the 1980s, called the “movement image”
and the “time image.” Trying to seize this something-both-more-and-less of cinema at
the threshold of the digital age is the main purpose of this essay.

Given the dominance of television and the internet, how can the cinema hold its
ground among the public spaces and private occasions where cinema, television, and
digital media compete with each other for audiences and attention? Is there such a thing
as “digital cinema,” and how innovative is it as an art form and a technology of sound and
image production today? Before one can answer such questions, there is a more funda-
mental one. Do cinema, television, recorded sound, and digital media belong together at
all, considering their very different histories? When one compares them, on what basis
and by which criteria? If there is a family resemblance (in Ludwig Wittgenstein’s sense),
what are the factors bringing them together or what drives them apart? Is the cinema
part of a general rush toward “media convergence,” or is it set on a divergent course, with
diversity the key media-ecological factor? In short: can the cinema maintain its place as
the most popular art form ever known, as well as prove to be the most “philosophical”
phenomenon among the technical media?

I want to discuss what I see as the cinema’s simultaneous marginality and centrality by
breaking the questions down into two different clusters or conceptual pairs. These pairs
are (multimedia) convergence, and digital cinema. Two further conceptual pairs, virtual
reality and interactive narrative, I leave for another occasion (or for others to take up).
The by now commonplace use of these four characteristics of cinema in the digital age disguises inherent tensions, if not outright contradictions in adjecto. Yet, instead of taking these naturalized oxymorons as proof that the cinema today is a hybrid medium, my argument is that any embedded contradictions should lead us to ask what is special about the state of the cinema in the first decades of the twenty-first century. Perhaps the contradictions resolve themselves at a different level of generality. No doubt, a look at the cinema from the vantage point of digital media can help revitalize our historical understanding of previous media (as suggested, among others, by Lev Manovich and Henry Jenkins). My own hope is that digital cinema (along with interactive narrative and virtual reality), more sharply defined, affords insights into our “second modernity,” which some claim is nothing short of a “second Renaissance” or a “soft Industrial Revolution.” Like its predecessors of the fifteenth through nineteenth centuries, the consequences of this revolution/renaissance promise to be uneven, divisive, chaotic, but also irresistibly interesting.

**Multimedia Convergence: The Place of the Cinema in the Media Mix**

The first half of this essay deals with multimedia convergence; the second half takes up the question of what digital cinema is. I conclude with some remarks addressing the epochal or epistemic changes associated with terms such as renaissance or revolution.

What, then, is multimedia convergence? Convergence usually implies that distinct entities or bodies are joined together, become similar, or even merge. It can also mean that certain discrete practices adopt a similar objective or pursue a common goal. In the case of the technical media, convergence points to a force that is setting originally distinct media on a common (i.e., convergent) course. As to the nature of the agency involved, opinion is divided, not least because one needs to distinguish different kinds of convergence. For instance, Henry Jenkins discusses five types of convergence (technological, economic, aesthetic, organic, and global), whereas Graham Murdoch identifies three kinds: convergence of communications systems, convergence of corporate ownership, convergence of cultural forms.

**Technological Convergence**

In respect of the convergence of technology (or communication systems), the key agency is, of course, digitization, the term usually invoked as the common denominator of all these paradigm shifts. The frantic pace and sheer scale of the changes have been such that one instinctively feels the need for a single source, and “digitization,” with its quasi-magical effects, neatly fits the bill. But just because the computer has made such an enormous impact in all areas of life, do we need to succumb to a new version
of technological determinism? Such an idea of “convergence” suggests an inexorable inevitability, and, with it, a sense of disempowerment that overlooks a number of salient countervailing forces also shaping the current situation.

It is clear, for example, that innovations other than the computer have affected sound and image production and reproduction: the transistor (portable radio and sound devices), the development of video and fiberoptics, but also jet propulsion and space technology. What we experience are the effects of parallel and mutually interconnected technologies, many of them driven by military considerations, rather than by an ideal of multimedia convergence. Media changes have, especially in Europe, depended also on legal and institutional factors, such as the deregulation of bandwidth and the “privatization” and subsequent proliferation of (commercial) television, as well as changes in censorship, industry self-regulation, and intellectual property right provisions. Then there are geopolitical changes: the world has moved from the two antagonistic power blocs during the Cold War period to four or five competing trading blocs, united (but also newly divided) by the dynamics of financial and commercial globalization. Globalization—it is true—depends on (even if it is not solely determined by) the traffic of information, services, and goods, which only the combination of digitization, computer software, telephony, and satellite technology has made possible.

Digitization in the more narrowly defined context of information media means, first, the technical ability of translating words, graphics, text, sound, speech, and images, as well as other sensory-perceptible signals, into uniform electronic bits of binary code, with perfect fidelity of recording and reproduction, complemented by high-density storage and an unlimited capacity to produce identical copies. Here, too, one needs to make a further distinction among media convergence, genre convergence, and device convergence. Device convergence means that, for instance, television screens, computer monitors, and projection surfaces for filmed images may come in different sizes or shapes, but would nonetheless be connected to similar processing units or input/output devices with computing power, hard-drive, random access memory, and internet access. The fact that my laptop now serves me as a typewriter, a telephone, a video screen, and a jukebox is an instance of device convergence, as is the digital camera and web browser built into my mobile phone. Media convergence indicates that the “content” of television programs and dynamic websites comes to resemble each other and become interchangeable, along the lines of, for instance, Big Brother reality shows, which are broadcast both on television and the internet. The fact that many radio programs now have talk-back or phone-in options (such as the BBC World Service’s World Have Your Say) is also an instance of media convergence. Genre convergence produces the sort of hybridity critics have noted above all for television, when referring to “infotainment,” “docudrama,” or “edutainment.” Often, genre convergence comes about through media-interference or crossovers in technology, for instance, in film genres such as mockumentary and fake documentary, or by a combination of animation and live action, as in Who Framed Roger Rabbit? (1988).
Economic Convergence

Economic convergence refers to a business strategy in which media and communications corporations try to increase their overall revenue by making various media outlets under their control (publishing, television and radio broadcasting stations, film and music studios) complement and reinforce each other by sharing content (books, film libraries, music, television programs). The strategy requires several elements to come together: first, a concentration of ownership, with fewer companies owning a larger share of the respective media “markets.” Second, it relies on government deregulation, allowing media conglomerates such as News Corporation, Bertelsmann, Vivendi, or Time Warner to own different kinds of media (e.g., film studios, television networks, radio stations and newspapers) under near monopoly conditions. Third, it is helped by the accelerated flow of information enabled by digitization, allowing images, advertising, and print material to circulate more easily and more rapidly through the different media systems. The perceived benefits are a reduced workforce and profit maximization, synergies in administration and savings in overhead, more leverage with advertisers, and higher brand name recognition and loyalty among consumers. A not inconsiderable side effect of such a form of horizontal integration (echoing the old Hollywood studio system’s vertical integration) is that it makes entry into such markets by newcomers and outsiders more difficult. It limits competition and encourages cartel-like practices of price fixing and downward pressure on suppliers and labor costs.

As one can see, in the convergence of corporate ownership, digitization is only one of the decisive factors. What makes digitization nonetheless a focal point of media convergence is the widely held assumption that digital conversion also means digital convergence. Add speed of access and ease of manipulation to the shared code, so the reasoning goes, and all the media whose content digitization converts into numerical sequences and algorithms—newspapers, movies, television shows, photographs, animated drawings, music, speech—will converge in one super- or hypermedium, a sort of permanent shower of “code” raining down on us, as in the opening credits of *The Matrix*. Common platforms and formats will convert this code-flow back into (graphic) user interfaces for human interaction, such as one encounters on multimedia web pages, supported by powerful search engines like Google and broadband connectivity. But this supposes that neither the institutional contexts of a particular medium (which, in addition to money and power, business models and legal matters, include “content” like religion and politics and “standards” like professional codes and industrial standards), nor the human users (which include their work and leisure habits, as well as their social needs and interpersonal dynamics) have the sort of autonomy that can exert influence on the ways technology and society evolve together and compete with each other.
Cultural Convergence

The last point requires a closer consideration of the third type of convergence (or resistance to it) embodied in cultural forms of media consumption, usually split between passive manipulation and active participation: “The old either-or oppositions (co-optation vs. resistance) which have long dominated debates between political economy and cultural studies approaches to media simply do not do justice to the multiple, dynamic, and often contradictory relationships between media convergence and participatory culture.” The technological backbone of this new participatory culture—the social networking websites, such as Facebook, Linked-In, YouTube, or Twitter—is made possible by the highly standardized software of internet browsers, search engines, and the creative commons initiatives; the widespread practice of downloads and file swapping of media content; and the universal spread of mobile telephony and GPS tracking devices. The effects of social networking, however, go beyond private use or bypassing copyright laws and usher in what Henry Jenkins, one of its most eloquent advocates, calls “cultural” convergence: “cultural convergence describes the new ways that media audiences are engaging with and making sense of these new forms of media content…. Cultural convergence has preceded, in many ways, the full technological realization of the idea of media convergence, helping to create a market for these new cultural products.”

Convergence in this sense recognizes that the flow of media content across multiple delivery technologies does affect audiences, but Jenkins maintains that this is not a one-way flow from corporations to their targeted consumers: “Media convergence is… a constant form of re-appropriation. [It is] an ongoing process, occurring at various intersections of media technologies, industries, content and audiences; it’s not an end state. There will never be one black box controlling all media. Rather, thanks to the proliferation of channels and the increasingly ubiquitous nature of computing and communications, we are entering an era where media will be everywhere, and we will use all kinds of media in relation to one another. [We are] dealing with the flow of content—stories, characters, ideas—from one media system to another.” To back his case, Jenkins cites the many cover versions, spoofs, remixes, and references to the Star Wars saga that circulate on the internet in the form of clips, scripts, or short films. Homemade videos of reshoot, reenacted, or reedited scenes from other blockbusters like Titanic and Batman or fake trailers for cult films like Pulp Fiction on YouTube, Vimeo, and countless other sites are apt indicators of intense activity on the part of fans and fan communities around the audio and image-products of corporate cross-media marketing campaigns, recycling, repurposing, diverting, and appropriating popular culture icons from music, movies, sports, and television shows.

This looks like a strong argument for claiming that convergence is indeed driven by user preference, jumping not only technical hurdles but “species barriers.” But, lest we forget: cinema, television, and the internet differ widely in their basic technologies, institutional histories, legal frameworks, and social practices. The cinema came from serial photography and depended on advances in cellulose production, as well as on perfecting the transport mechanism of the sewing machine and the bicycle. Demographically,
it grafted itself on the music hall and vaudeville houses, and aesthetically on the magic lantern and the stereoscope as popular entertainment forms. Going to the movies is (still) not the same as watching the identical film on television. Television depended on the technology of the cathode-ray tube, it scans an image rather than frames it, it shares most of its institutional history with radio, and initially hesitated between becoming “armchair theater,” an electric variety program, or an instrument of state-controlled political consensus building. Video is technically an extension of the audiotape, itself a wartime invention, whereas the internet, as we know, exploits the combination of the computer and the telephone: developed by the US military, it became a mass-medium via university scientists and research scholars, and its institutional forms are hotly contested between (US and EU) lawmakers, business interests (Google, Microsoft, Apple, Amazon), and defenders of global, if not millennial egalitarianism (“creative commons”). Multimedia art, virtual reality environments, telepresence, and digital sound each have their own serendipitous and leap-frog histories, so that it requires some feat of the synthesizing imagination to conceive of them as belonging together, let alone as suddenly sharing a common evolutionary ladder or joint telos. And yet, such is the impact of the “information revolution” that we now tend to think of them as not only “naturally” linked, but developing in the same direction, transferring their common denominator uses into a technologically based teleology.

Cinema and Convergence

A look into the cinema’s history indicates a more nuanced picture. Convergence also suggests obsolescence, yet, so far, different media rarely replace one another (think of the “paperless office” promised by the advent of the computer!). Neither do they straightforwardly “improve” on each other (who has not thought, after a laptop crash: “if the book had been invented after the laptop, it would be an improvement”), nor do they determine each other (in the sense of one medium “answering” a question posed but left unresolved by another). Cinema did not “respond” to the magic lantern by solving problems that had arisen in the practice of magic lantern shows. It repurposed aspects of the basic technology and parasitically occupied part of its public sphere, along with the sites of live performances, such as vaudeville and the music hall. Television has not “evolved” out of cinema nor did it replace it, dire warnings about the “death of cinema” notwithstanding. Digital images were not something the film industry was waiting for to overcome any felt “deficiencies” in its production of special effects. Video didn’t kill the radio star: the internet (and MP3 players, podcasts, and mobile devices) gave radio a huge boost and an entirely different lease on life. A new medium may extend the overall spectrum, bringing about unexpected combinations, but it can also lead to rounds of boundary drawing and ring-fencing. While it thus reconfigures the conjunction in which all media operate at any given point in time, a new medium also tends to “rewrite” the other media’s histories, to make room for its own genealogy.
Additionally, the dynamics of device convergence are not solely dependent on digitization. To cite a specific example: Ann Friedberg has looked closely at the case for convergence initially around cinema’s relation to television. Examining successive technological innovations, such as the VCR, the remote control, and cable television, she argues that these, taken together, began to irreversibly erode the historical differences between cinema and television, even without “digital convergence.”

Preceding digitization, the driving force was the growing interpenetration of cinema and television thanks to new delivery and distribution systems, symbolized by cable television on the one hand and the video recorder/prerecorded videotape on the other. By bringing time shifting and the individual ownership of a film (copy) to the consumer-spectator, these innovations demanded new theoretical models and a revision of mono-causal explanations. Accordingly, convergence began before the personal computer; it did not wait for the digital. And, while deploying new technology, at its core was a new business model of delivery on demand. Friedberg successfully separates convergence from “digitization” and thereby implicitly points to one of the more obvious and critical objections: that the convergence thesis is above all a marketing ploy, part of the hype that has surrounded digitally based devices as they tried to transform themselves into mass consumption commodities. When applied to the cinema, as we saw, convergence invariably designates the strategic alliances between the owners of traditional media. There, multinational business conglomerates invest in the print media (newspaper and publishing), in television (terrestrial and cable), in the film business, in audio recording media, and delivery systems such as the internet to effect economies of scale and consolidate centers of power and influence that reestablished the old trusts and monopolies of the studio era while further globalizing their reach.

Convergence, in this sense, is above all an advertising concept of media producers, which only in the second instance hints at a broad sweep of universal aspirations in leisure and entertainment among large sections of Western and non-Western consumers that Jenkins hails as cultural convergence. It entails identification with common visual icons (“brands”), the use of common technologies, and it depends on hegemonic modes of representation. Convergence would thus be the term that disguises the business interests of those who see multimedia primarily as a provider of profit from the exploitation of mono-content, but it would also be a shorthand for very heterogeneous factors of globalization in the spheres of information, communication, representation, and culture, also often referred to by the term “cultural imperialism,” for which US popular culture in general, the Anglo-American music industry and Hollywood in particular, are the (perhaps somewhat too convenient) outward signs.

These historical notes of caution aside, however, a degree of convergence between the print and audiovisual media is undeniable. When I open the *New York Times* on the internet, I have an old-fashioned newspaper, with columns and blocks of text, but I can also click on short television features, with a correspondent commenting the news, or look at the trailer of the movie about to open worldwide this weekend. Interlaced with this material are ads that look like photographic images but, as my cursor grazes them, they come alive and transport me to another place: a website, a looped movie, or
a telephone number. Generally, websites started out looking like newspapers, emulating their set grids and predefined columns, whereas newspapers extensively use websites as advertising tools. Both media feature animation, sound, and digital video clips to convey information rapidly, snappily, and in a way that grabs the reader’s attention and retains it. Television, too, increasingly uses split screens or multiple windows. News programs rely on sophisticated graphics, computer animation, and a continually updated, “refreshed” text-frieze, thereby suggesting a kind of co-evolution between these three heavily “designed” and customized environments that are the print media, television, and the internet. Also in tremendous flux with regard to function, design and styling are other traditional formats combining text and visuals, such as posters, billboards, manifestos, pamphlets, graffiti art, maps and the like. All are still very much present both in the physical and digital worlds, living in the minds of makers and producers, as well as in the perception of users and consumers, so that their interdependence and overlap (and their increasingly “dynamic”; i.e., user-responsive character) suggests a certain convergence, especially if viewed under such common denominators as advertising, infotainment, promotion, political propaganda, or journalistic agenda-setting.

Yet, with respect to the cinema, the case for convergence is more complicated. First, regarding technological convergence, we are still a long way away from full-blown device convergence, with format interchangeability and a single platform. On the contrary: almost as much speaks for divergence as for convergence, or perhaps for “bi-vergence”: parallel developments, but in opposite direction, such as larger/smaller or fixed/mobile, when one focuses, for instance on “screens.” From the point of view of the user, for instance, there is a tendency for moving image platforms to become more mobile, miniature, and multipurpose (converging around the mobile phone and its hybrids, rather than the television set and computer monitor), but there is also the opposite development, namely home entertainment centers becoming larger, more sophisticated, and more integrated. Likewise, the projection experience, so typical of the cinema, has seen larger screens in theaters and in the home, but the dynamics of each reconfigure themselves around the variables domestic/public, with their quite different affective, social, and perceptual “experience economies.” If, in this development, the cinema retains and even extends its value as a unique kind of social space and a fixed architectural site, with its own cultural values mainly invested in the political significance of “public”—or rather, in the mysterious combination of intimate and public—then the domestic space, already refigured by television, will once more open to feature films the “family audiences” that the cinema lost to television since the 1960s—hence the rise in big-budget children’s films, animation features, and fantasy genres.

As we saw, much less open to doubt (and therefore the more controversial) is economic convergence in the area of mainstream cinema ownership (horizontal integration, corporate cross-media “synergy”). Jenkins, as indicated, vehemently argues against the view that such multimedia convergence must lead to mono-content, taking the perspective of the active spectator, user, prosumer, and associated fan communities. Although one may not share all of his optimism, he is surely right to want to think beyond the “reification/alienation” and “mass-deception” arguments of Frankfurt School theorists.
Most important, though, the convergence theory as applied to the cinema is frustrated by the fact that a special kind of (cultural) value has become attached to the cinema’s traditional material basis, the optico-chemical process, whereby celluloid, coated with a light-sensitive emulsion, directly bears the imprint of the objects or views that are before a camera. As digital conversion does away with this material basis, such a modification cannot but challenge definitions of what cinema is, and, by implication, must change what we have come to regard as the specific qualities of the medium: photographic iconicity, guaranteeing the cinema’s “reality effect,” combined with the special kind of indexicality, the existential link with the real, guaranteeing the “documentary” truth-value that makes the moving image such a special kind of historical “record.” Especially widely discussed is this loss of indexicality in the digital image: did it bring about a rupture in the history of cinema that some critics have experienced as traumatic and terminal, or have we simply misunderstood the meaning of “index”? For those in the former camp, digitization quite literally means the end of the cinema, so that there cannot possibly be convergence. Instead, in this light, an era of post-cinema has begun, with its own characteristics and certainly based on a different ontology.

In the latter camp, are those who argue against such a radical “rupture” theory of cinema. They hold the view that our current uncertainty of what is cinematic about an image does not depend on either indexicality or digitization, and that the dilemma is a false one. Philosophers such as Gilles Deleuze or art historians like Aby Warburg have pondered the relation of still image to moving image without reference to (digital) technology. Indexicality as constitutive and inherent in the photograph was deconstructed long ago by Umberto Eco, on strictly formal grounds, when he pointed out, for instance, how embedded in a complex definition of the sign the concept of the index is in C. S. Peirce. Others, too, have argued against the photograph becoming fetishized as a privileged material support for the “reality” effect, compared to the video image or the pixel, itself a much broader concept when we think of its long history, stretching from optical illusionist toys that work with black-and-white dots to pointillist painting. All this merely to indicate that the ontological or philosophical questions now commonly addressed to the cinema’s future require, at the very least, a wider context, in which digitization is itself merely one factor, however crucial.

What, then, can be the overall conclusion regarding the conjunction of digitization, multimedia, and convergence with respect to the cinema? As suggested, the case for convergence in the generally understood sense as technologically driven is at best half the story. The main forces of convergence have been economic and demographic, determined by multinational company policy and the quest for global audiences, not forgetting the economic surplus value of segmented, locally addressed audiences. Since the early years of the past century, the audiovisual media have (apart from military uses) always developed primarily as mass-produced services in a sector of the economy—the leisure, culture, and information industries—that has seen quite exponential growth after World War II, with an acceleration of the pace of change during the past twenty years, but also with increasingly more volatile consumers. Convergence in this sense happens under the sign of capitalist concentration, merger, and cartelization: the
result of the media empires of the 1980s (News Corporation, Time Warner, Seagram, Bertelsmann) and the digital start-ups that survived the dotcom bubble and reinvented themselves as megacompanies (Microsoft, Google, Apple, Facebook) is that common ownership has succeeded in holding the audiovisual, print, and electronic media together by also creating a common social base: the mass-market consumer, targeted, profiled, and tracked by a huge and still hugely expanding marketing and service industry that data mines preferences, likes, dislikes, and their volatilities. Thus, from the audiences’ point of view, convergence means that different media products are often linked to each other, both intertextually and materially, by shared distribution and marketing practice, when the same product circulates and is repackaged in different forms of media.16

This is perhaps why the culture at large still finds a horizon of eventual convergence (in the sense of concentration, synergy, common standards, and linked products) a convenient way of getting a grip on this new multidirectionality of media interpenetration, facilitated by this globalization of ownership on the one hand and the shared technical code of digitization on the other. Although ignoring both the history of the individual media and their very different institutional and cultural meanings, the convergence argument remains attractive because it promises to ground the study of the audiovisual domain in a new telos. No longer having to struggle with the supposed goal of greater and greater realism, nor with the realist “ontology” of the material index and the mnemonic trace (with its implied obverse of “illusionism” and “simulacrum” that so much polarizes those “for” and “against” the digital image), the convergence thesis prioritizes the spectator as pragmatic user-consumer and the industry as corporate agency driven by technological competition and profit maximization. Assuming a move from public to domestic space, the spectator is imagined as preferring a single multipurpose and multistandard device that allows ease of access and convenience of use for very different media products, whereas the corporate agent “targets” this user ever more relentlessly into the recesses of his or her personality, desires, narcissism, and psychic dispositions.

However, so complex and diverse is this picture of convergence that one wonders whether the term can encompass all the different layers, processes, and dynamics at work. I personally prefer another term, for which, however, there does not exist a good translation: the German concept of Verbund, somewhere between “network” and “affiliation,” between “alliance of convenience” and “mutually interdependent antagonism,” capable of indicating material discreteness, historical distinctiveness, and the simultaneous dynamics of competition and cooperation. At one level, such an alliance of convenience is the same as multimedia convergence, if considered in its multiple meanings. At another level, it is the opposite because it acknowledges not only competition and cooperation, but also mutually interacting encounters at very different levels and with all the unintended consequences that are so typical of all technologically driven contingency, because implying elements of bricolage and recognizing serendipity and uneven development. Furthermore, such mutual interdependency may operate like a cartel, with mergers, takeovers, and buyouts, but it can also be more like diplomacy, requiring negotiation, trade-offs, and give and take.
On a more methodological rather than terminological level, I think the precise nature of such media interaction, interference, and succession needs to be looked at separately, as a problem of media-historiography (as discussed by David Bolter, Richard Grusin and Lev Manovich for new media, and for cinema history by Noel Burch, David Bordwell, Tom Gunning, and Sean Cubitt). The positive point about convergence is that its “logic” demands a move away from notions of “rupture” and “epistemic break,” basically suggesting others forms of contact, contagion, and interaction. Convergence can also be a useful first concept in the encounter of science and humanities (say, between the neuro-sciences and the philosophies of mind). On the negative side, convergence disguises the power relations that exist between media and the co-extensiveness of their encounters and contact zones, as well as the fact that important (technical) advances often happen simultaneously and yet independently of each other.

First Preliminary Conclusion: total technological convergence between the cinema and television or between the cinema and the internet is unlikely, if past experience is anything to go by. The “revival” of the cinema since the 1980s as a distinct social and architectural space of experience especially points toward a divergence of “cinema” and “film.” By contrast, economic convergence among cinema, television, the music business, publishing, and the internet is a fact (as far as Hollywood is concerned), having—in addition to the globalization of audiences—added another dimension through the convergence of the military and the entertainment complex (always a reality, but now taking place in full view). This convergence I would prefer to call an “alliance of convenience,” to forestall the idea of a common goal or telos or even of a common interface, whether technical or cultural. Rather, the economic value of the cinema is its distinctiveness vis-à-vis the other media (outlets). Cultural convergence (as envisaged by Jenkins and others among fan communities and their relation to films as texts to be reworked and recirculated) is an important phenomenon (now “industrialized” by Facebook and Twitter). But, rather than seeing this aggregation of communities around the liquidity and malleability of digital media objects as an instance of (countercultural) participation, one should bear in mind that, largely due to developments such as dynamic data mining, social network media, blogging, collaborative filtering, feedback loops, and other pull technologies, there is convergence (i.e., cooperation and collusion) between the media conglomerates and the fans (even when they perceive themselves as oppositional). Convergence of this kind is technologically enabled, economically contested, culturally motivated, and takes place in a space that is “virtual” while nonetheless having “real” social consequences.

Digital Cinema

Even such a relatively cursory assessment of the convergence theory, its commercial logics and inherent tensions (the possible confusion of conversion and convergence; the uncertainty of the kind of telos implied; the terminological overstretch, when
Digital Cinema as Functional Equivalence: More of the Same Except by Other Means?

In one sense, digital cinema is simply one among a number of ways of making films, and then distributing, exhibiting, or archiving them. The basic principle involves using digitization to record, transmit, and replay images, rather than using light-sensitive chemicals (emulsion) on film (cellulose or polymer). Digital cinema still employs optical lenses to capture, bundle, and refract light, but these, too, may over time be replaced by light-sensitive fibers. The main advantage of digital technology over analog film is that it can transmit large amounts of information exactly as it was originally recorded. Analog supports, such as celluloid and audiotape, lose information in transmission and reproduction, and they gradually degrade with multiple viewings. Digital cinema’s major disadvantage (until recently) was that the information contained as pixels in an image was inferior to that of 35mm film stock. Against this must be held that digital information is more flexible (malleable, mutable, modifiable) than analog information. A computer can systematically alter digital data, adjusting all the parameters of an image (such as size, scale, color saturation, tone), compared to the much more restricted range of changes that can be made to photographically recorded images. At the limit, a
digital image is not really an image; generated by a different process, it is in essence a set of instructions whose execution (visualization, materialization, manipulation) obeys a mathematical rather than an optical logic.

As such, digital cinema can affect all the major areas of movie-making: production—how a movie is actually made; postproduction—how a movie is edited, combined, or synched with sound and assembled; distribution—how a movie gets from the production company to movie theaters; exhibition and projection—how a film theater presents and projects a movie. In practice, the introduction of digitization has so far had a variable impact on these different aspects of the institution of cinema and, in the process, has brought to the surface several sets of competing agendas and contending claims. The result is that digital cinema today represents a particularly striking case of uneven development and nonsynchronicity with respect to the technological, economic, and cultural factors involved in implementing new technologies.  

Going to the local multiplex to watch the new Hollywood blockbuster, I might be forgiven for thinking that very little has changed from what the cinema experience was like nearly a hundred years ago. I am still sitting in a theatrical auditorium space with racked seating for a gathering of spectators, I am still looking at a projected (photographic) image, and I am still engrossed, for the most part, in a narrative live-action feature film, lasting on average between 90 and 150 minutes. So, why the confusion, the anxiety, the hype that has attached itself to “digital cinema”? It depends, of course, on whom one asks. Given the long history and relatively stable technology of celluloid-based cinema, coupled with the fixity of the aesthetic norms underlying the “classical” fiction film and the uniformity of the commodity product we know as the full-length feature film, it is tempting to think that, at the movies, it is “business as usual.” This would be to conflate the cinema as an audiovisual storage medium for motion pictures with the cinema as a projection-based spectacle in a public space. On the other hand, realizing that much of what I see on screen was never “in front of” a camera, but generated inside a computer, and that my projection may well be a celluloid transfer from a digitally recorded and edited master, it is possible to claim that such a performance is no longer “cinema.” Then again, buying a current release or a digitally remastered classic on DVD and watching it on my laptop or in high definition on my home entertainment center, I can only marvel at the convenience, richness, and sensuousness of the experience and come to the conclusion that there has been seamless convergence between analog and digital, and that—after television, the small screen, the video recorder, and the DVD player—the point may have been reached at which the “history of film” and the “history of cinema” no longer divide either along the lines of “product” and “service” or “work” (autographic) and “performance” (allographic), but that both terms have become in some sense “metaphoric”: naming ways of relating to our environment, to each other, and of “being-in-the-world,” and thus requiring philosophical as well as technological differentiation.

For the fact of the matter is that going to the cinema today means that nothing has changed and that everything has changed. Behind the scenes, as it were, modifications have been at work at almost every level. But they have, by and large, been integrated along the lines of “functional equivalence,” meaning that the introduction of a new
technology or technique at first substitutes for something already familiar: doing the same thing with different means. Although this has knock-off effects on other aspects of the filmmaking process or may lead to trying out new things, these generally result in an overall readjustment of other parameters and not in a radical change of craft, method, or style. This, at any rate, is the model that has defined Hollywood’s approach to new technology, if one follows David Bordwell, Janet Staiger, and Kristin Thompson in their Classical Hollywood Cinema: Film Style and Production.33

Sound, 3D, and Expanded Cinema

What, however, has changed substantially and is often credited with having revived the film industry in the 1980s is film sound. “Surround sound” was itself influenced and inflected by the Walkman experience of the 1980s, making what used to be known as “personal stereo” become a collective, shared experience: a new kind of public intimacy conveyed through the sound space we share with others in the dark.24 Dolby, multichannel directional sound has given the cinema a new spatial depth and dimension, which four key films from the mid to late 1970s (Nashville, Jaws, Star Wars, and Apocalypse Now) pioneered very successfully—each in its own way—to redefine the movie experience.

This redefinition is not only technical; rather, the technical and the cultural aspects interfere, cross-fertilize, and mutually implicate each other: the new film sound reflects the generally changing relation in our culture between “sound” and “image.” More and more, it is sound and noise that define public and private space, inner and outer worlds, norm and exception. At least since Dolby noise reduction systems were introduced, sound has been experienced as three-dimensional (3D), “filling” the space the way that water fills a glass, but also emanating from inside our heads, seemingly empowering us, giving us agency, even as we listen passively. In the cinema, the traditional hierarchy of image to sound has been reversed in favor of sound now leading the image, or at the very least, giving objects a particular kind of solidity and materiality.25 It prompted film theorists Christian Metz to speak of “aural objects”;26 led to a new scholarly approach to “audio-vision,” for which Michel Chion stands as exemplary;27 and created a new industry profession, that of the sound designer, which Walter Murch has helped raise to prestige and artistic status.28

Taking sound and image together, it is clear that the introduction of digitization has affected the three traditional branches of the film industry in different ways. Production was the first to be drastically altered, whereas distribution and exhibition have been much slower to adjust, partly because the benefits are less clearly quantifiable while the cost (for instance, of refurbishing theatres with digital storage devices and new projection equipment) is very quantifiable indeed, as are the effects on vested interests, such as labor, infrastructural capital, patents, and monopolies. Digital distribution offers, at first sight, substantial cost benefits to the producers because films, instead of having to be distributed via individually struck prints and then shipped in cans at enormous
expense, could be sent as computer files through broadband cable or transmitted via satellite. Given the high advertising cost of a film and its intensive exploitation in the first weeks of a picture’s release, such digital distribution would also make it easier to open movies in theaters all over the world on the same day. But what delivers major savings for producers compels costly investments for exhibitors. These the exhibitors have been reluctant to make unless subsidized by the prime beneficiaries, the producers, or recouped at the box office through higher admission prices, as was the case with the slew of 3D movies in the 2009/2010 season (which included such blockbusters and critical successes as *Up, Alice in Wonderland, Coraline,* and *Avatar*). Technically, digital projection has sufficiently matured to stand comparison with analog projection, notably through the use of systems (such as Micromirror) that split the light via a prism into separate color beams that form images by hitting microchips fitted with an array of tiny, hinged mirrors. George Lucas was an early advocate: his company launched *Star Wars - The Revenge of the Siths* in some fifty theaters in the United States via digital distribution and projection already in 2005.

The hype around the reintroduction of 3D should therefore be seen in a double context: first, it gave exhibitors an incentive to install digital projection, and, once in place, it becomes less important whether 3D proves to be a passing fad, a niche attraction, or takes over the mainstream. The second context, however, has to do with sound. Jeffrey Katzenberg, one of 3D’s most fervent advocates, speaks of it as the third revolution in cinema: “There have been two previous revolutions that have occurred in movies. The first one is when they went from silent film to talkies, and the next one happened when they went from black-and-white to colour. Which was 70 years ago. In my opinion, this is the third revolution.” The surprising aspect of his “revolution” is not that he presents a rather too streamlined and goal-oriented version of film history, but that he very much sees 3D as taking “vision” out of what he calls its “vinyl phase”: “As human beings, we have five senses: touch, taste, smell, hearing and sight. The two senses that filmmakers use to affect an audience are hearing and sight. And if you think about the evolution of sound, [which] in our lifetime, . . . has gone from vinyl to an 8-track to a CD to digital. But sight is kind of at vinyl right now.” The metaphor is telling because it implies that the industry itself is thinking of spatial images as catching up with spatial sound, not the other way round.

When it came to production, the industry was much faster in adopting digital methods for shooting and especially for editing feature films. Even though investments in new technical equipment and human skills were initially also very high, the savings in time and improved control proved universally persuasive factors. There were surprisingly few outward signs of upheaval and change, at least when compared to the incisive transformations (of labor organization, business strategy, and “synergy”) that took place in the 1970s and 1980s, when Hollywood went global, adopted the blockbuster as a multimedia marketing platform, and was taken over by information and telecommunication conglomerates: that is, changes that preceded the impact of the digital.

If film production has shifted quickly to digital technology, did any saving in money and time translate into corresponding changes in the power structures of the industry?
Probably not, given that the commercial film industry, but also the independent sector, has always been hierarchically organized. What has changed is the importance of “outsourcing,” and what has intensified is the relentless search for cheap locations and labor, but both are within the traditional logic of Hollywood practice. Has digitization lowered the entry barrier for new talent? Again, not in itself, since, in the end, access to equipment and stock does not translate either into talent, production values, or access to distribution. Conversely, digitization of production has had immense influence on styles of filmmaking, not just thanks to the potential for creating fantasy worlds through special effects, but equally noticeably in the documentary sector, with more fluid and close-up camera work. Indeed, the camera has become more like the extension of the (helping) hand than of the (observing) eye, so that film spectatorship is moving in sync with other aspects of a more participatory culture. In addition, just as the audio CD has given a new value and currency to vinyl (see above), the digital as default mode of the image allows filmmakers to invoke the (artefacts of the) analog mode (whether the grain of celluloid or the fuzziness of video, or the pristine hues of black-and-white), as so many ways to draw attention to the poetics of obsolescence.

Thus, faced with the reality of digital cinema at the point of production and postproduction and the eventual penetration of digitization into the areas of distribution and exhibition, one must distinguish not only between the different branches of the institution of cinema—what I called film as product and cinema as service—but also between different parties or players and their respective agendas or roles. Next to the producer, the distributor-exhibitor, and the movie audience, there is the independent director and the avant-garde artist. For each, a separate cost-benefit sheet arising from digitization could be drawn up. For instance, if “digital cinema” means for the studio or producer that it is business as usual because, as usual, it’s (about) business—the chance of exceptional returns on investment in a high-risk service industry—then, for the independent director, the combination of digital equipment, stock, and editing software connotes a significant break: it makes filmmaking potentially much faster, possibly much cheaper, and it gives the director more short-term control (being able to scrutinize the results instantly, compared to, say overnight rushes) but also greater overall control over his or her picture and access to new promotional channels such as YouTube, Daily Motion, or Facebook.

Digital Cinema and the Avant Garde

Similar, and yet quite different, is the stake that the avant-garde artist has in the availability of the digital as a medium next to video and celluloid. She or he, too, is sensitive to the cost factor of equipment and material, but the constraints and compromises that, for instance, a mainstream director or an independent producer-director has to consider when shooting for theatrical release, while simultaneously needing to factor in television broadcasts and a DVD release, do not arise in quite this way when digital techniques intersect with those of video-art. From the moment that Nam Jun Paik picked up
the first semiportable video recorder at the Sony laboratory in 1965, video as an artistic “material” and video as a broadcast medium have developed in separate directions. By entering the gallery spaces, video-art guaranteed itself recognition and legitimacy, and thus also a history, with its critical discourses secured by the presence of Andy Warhol, Bill Viola, Yoko Ono, Bruce Nauman, Dan Graham, Gary Hill, or Lynn Hershman, all of them original artists and distinctly innovative whose interventions and body of work has written video into modern art up to this day, alongside pop art, Fluxus, and happenings, as well as contemporary painting, sculpture, and installations.

The digital turn has given video art a new lease of life, as well as inscribed it into a genealogy different from that of cinema. For, with the availability of digital media, artists and scholars trained in alternative film histories immediately recognized the historical as well as aesthetic links between video art and the new media (with their interchangeable formats and common platforms) but also the genealogies that traced both digital and video art back to the “beginnings” of cinema. This, in turn, led to digital cinema acquiring yet another pedigree: the long practice of “expanded cinema” (notably among the New York avant garde around Ken Jacobs, Jonas Mekas, and Stan Brakhage, as well as key figures such as Paul Sharits, Hollis Frampton, and Michael Snow, who, to varying degrees, recognized their own aesthetic agendas ranging from mixed media to Gesamtkunstwerk ambitions in the possibilities of digital media).

Whether it was the non-narrative forms represented by hypertext architectures, the new editing techniques of compositing and overlay, or a quite different conception of pictorial space—the frame and graphic abstraction—several kinds of connections emerged between the avant garde and new media, complementing as well as complicating the perceived affinities of the avant garde with early cinema, which had so strongly marked cinema history in the 1970s and ’80s, as reflected in the writings of Noel Burch, Charles Musser, and Tom Gunning.

In Europe, directors such as Peter Greenaway, Bela Tarr, Alexander Sokurov, and others also looked to the possibilities that the new media afforded in the way of experiment with seemingly obsolete filmmaking styles, but it was above all the crossovers between cinema, video installations, and gallery art (e.g., Chris Marker, Isaac Julien, Harun Farocki, Mona Hatoum, Douglas Gordon, Tacita Dean) that gave a new impetus to reflect about cinema in a multimodal, cross-media, transhistorical context. Hence, the elaboration of a vocabulary that speaks of intermediality, of hybridity, of expanded, and even “exploded” cinema to retain a sense of difference in texture and voice, of a clash of associations, emotions, and intensities; of the effects of shock or surprise associated with a mixture of film-based and digital techniques, while retaining a sense of affinity with a common aesthetic heritage across cinema, video, and digital art: for instance, around stillness and movement; “magnification” and scale; faciality and frontality; attention, absorption, and attraction–distraction—not to mention immersion and interaction. Whatever qualms one may have about the varying terminology, there is merit in the insight that the traditional performing arts, notably theater and dance, but also the fine arts, such as painting and sculpture, can usefully be seen under the rubric of “media” and thus should be brought into creative-critical contact with cinema and the moving
digital cinema: convergence or contradiction?  31

image in the twenty-first century. For artists within the fine art tradition, the notion of convergence is not an obvious telos, committed as they are to medium specificity and self-differentiation, but the recognition that aesthetic parameters such as those just enumerated are shared among the different arts is now a commonplace, even if academic art history is slow to catch up. But the question of on what historical or conceptual (rather than pragmatic or prescriptive) grounds such a “convergence” of art history, the museum, and the moving image can be usefully argued, has indeed become a very fruitful area of debate. 34

Babette Mangolte, an independent filmmaker, has written about the shock she felt when first working with the digital (or “pixel”), because she could not get used to the fact of it not having the depth of the photographic (“silver-based”) image. Even once she added depth through special effects, it seemed to her a simulation, the optical illusion of depth, which had nothing to do with depth in the real world. Yet, in the visual arts, exploring flatness has been the central concern of modernism (especially of the Russian avant garde, notably El Lissitsky and Malevich). Are we, with the pixel image, facing the situation described by Eisenstein, Benjamin, and McLuhan, when they noted how an aesthetic problem (here, the relation of flatness to depth in perception and painting) identified by an artist, to which he or she brings an answer in one medium, is given a meta-turn by the subsequent medium, where it becomes not an aesthetic, but merely a technical issue? In this case, the digital image would have made not the emulation of human vision but the flatness of painting its default value, whereas human perception of depth would have become (one of) its special effect(s), thus turning an aesthetic concern into a matter of technique and thereby “automating” the artist’s task.

Mangolte also responded to the fascination that came from the digital camera’s “floating” point of view, already hinted at earlier when I suggested the move from eye to hand, and which she describes by saying that the digital image is not tied to a locatable point of view, that the camera can get extremely close without distortion, that the image can be manipulated free from the body. This, in turn, creates an image unbounded by a frame, disorienting because made strange by suspending the human point of view and the human scale, introducing different spatial coordinates (as well as upsetting the calibrated or graded sense of distance and proximity we normally have toward the world).

Audiences, too, are divided by digital cinema: for some, it opens the choice of assuming different spectatorial positions by extending the repertoire of roles from voyeur (as familiar from classical cinema) and witness (typical of documentary and art cinema) to participant, player, user (video games, virtual reality environments) and consumer (of merchandizing, tie-ins, spin-offs). Others—the cinephiles—draw, as indicated, a line in the silicone sand: in their eyes, the digital image is no longer cinema because the loss of indexicality of the image touches the cinema’s core: its reality status and photographic essence, defined by luminosity, transparency, and projection, none of which is a prerequisite of the digital image, however much it can emulate transparency, create luminosity as a special effect, and utilize projection.

For media theorists, finally, the digital image frees cinema from a number of misconceived ontologies (of realism) or erroneous philosophical assumptions, again mainly...
around the truth status of the photographic image, around mimesis and the question of “illusionism.” The digital image thus opens up a new understanding of the conditions and limits of the particular symbolic code we call “representational,” with its formal schemes (receding sight lines, a single vanishing point) and historical origins (easel painting, the European Renaissance) but also its cultural implications (the “open window,” the framed view, the vanishing point, and the horizon) and ideological effects (such as putting the imperial eye and sovereign single subject at the center of the image and thus the world).

The Cinematic Versus the Digital: Effects, Properties, Logics

One’s first response to digitization might therefore justifiably be to welcome the air of uncertainty and potentiality around “digital rupture” and “media hybridity” and to believe in the possibilities that this “turn” can bring to sound-image combinations. If nothing else, the spectre of the telos of convergence and of technical determinism hovering over digital cinema helps to focus on inherent flaws and contradictions, shortcomings, and misconceptions in the accepted accounts of film and visual media history. It has led to the fields of “early cinema” and “media archaeology” being among the most vibrant and productive areas of academic research and teaching. At the same time, the argument of a fundamental rupture between analog and digital should be taken seriously and put on a broader basis than simply remaining tied to the material support of the image. It has already led to a more philosophically informed debate about what is an image, what is movement, and what is the contribution of “the cinematic” to everything from politics and propaganda, to anthropology and art history. This is why, at the outset, I insisted on the oxymoronic nature of “digital cinema,” now highlighting the possible areas of contradictio in adjecto by setting in opposition not analog and digital image, but “the cinematic” and “the digital,” in terms of their respective effects, properties, and logics. That these three registers of specificity might be also an artificial divide is a possibility (see Lev Manovich on “what digital media are not”), but as a heuristic exercise, they prove essential for my argument.

Among the specific cinema effects, one would first list the impression of reality, that is to say, the high iconic fidelity that the photographic image carries. The “reality-effect” is also a consequence of the impression of movement, which, in turn, is complemented by the impression of presence, strengthened by sound, but also providing one of the typical subject effects of cinema; namely, the impression of being included in the image and endowed with a special kind of ocular-sensory, embodied identity. This identity effect is crucially shaped by the cinema’s reliance on narrative and, in particular, on the causally organized linearity of mainstream feature films, where different narrational strategies (point of view, shot reverse shot, close-up) ensure a “binding” and “stitching-up” (the famous “suturing”) or a “focalization” (in a more literary vocabulary) of the spectator as “subject.”
The key digital effects in such a comparison would be the impression of hyper-reality, which would lead to an impression not of movement but of metamorphosis; that is, not only in the form of morphing and shape-shifting, but also as a constitutive instability of scale, mobility of point of view, and inherent “liquidity” of the (visual) representation. Second, instead of giving an impression of identity and presence, provided in the cinema by the stable configuration of projection, frame, and linear fictional narrative, the subject effect typical of the digital would be the impression of agency, tactility, and interactivity. The latter, in turn, has to be assessed against the digital forms of narrativity and fictionality, which are characterized by simulation and hyper-reality, by multiple narratives, branching narratives, and narrative loops. In each case and on both sides of the divide, these effects are “illusory,” but this implies also a new meaning for the term “illusion.”

When one now turns to cinematic versus digital properties, the obvious difference is that cinema relies on the photographic image, whereas the digital is based on the numeric image. Second, in the cinema, the screen is understood as a two-dimensional projection surface, with extension of the image into lateral depth (even when the actual screen is a small or large LED screen, monitor, or touch screen). In the digital, the screen can best be understood as a display (based on the graphic user interface) whose dimensionality is variable, capable of looking two-dimensionally “flat” even when the image is “projected” and suggesting stereoscopic or holographic depth even when the images appear on a handheld device. As already indicated, the cinema relies on a fixed arrangement of camera-projector, spectator, and screen (usually referred to as the cinematic “apparatus”), whereas the digital “apparatus” (if one can speak of it as such) is the geometrical grid and the box, typified by the “desktop” interface, by the predominance of the rectangular “page,” and a generally topographical spatial arrangement, with little suggestion of projected depth. Even when one speaks of “cyberspace,” the sensory encounter with digital data (including visual material) is either still predominantly 2D or (in the case of 3D computer animation) immersive, both of which environments are quite different from the “projective transparency” typical of the cinema.

The grid-box scheme of digital media also determines the kind of multimediality typical of the digital, which is the combination of script, graphics, sound, still image, and moving image in one display frame, multiply divided, segmented, and layered (inspired, as suggested earlier, by the layout of newspapers, with banner headlines and inserts, when one thinks of the screen of a news channel, for instance), whereas the cinema tries to integrate and make transparent its own multimediality: such a seamless integration and hierarchical organization of its different sensory data and input channels (sound, image, speech, text, graphics) being another name for its “reality effect.” Finally, one of the defining properties of the cinema is that it is a public performance, taking place in a shared space (auditorium), whereas the digital realm establishes its public sphere and imagined communities in quite different ways, independent of shared time, location, and space. It is organized through “sites” (networks, nodes), where—in principle—access is open, permanent, and ubiquitous (“online”), compared to the time regime (scheduled performances) and the rituals of exclusion and inclusion typical of
the cinema, where the purchase of individual tickets, the lobbies, concession stands, doormen, and usherettes act as markers of a series of liminal spaces, with an implied cultural symbolism of threshold and privileged access, in the force field of what I called “public intimacy.”

Turning finally to the respective “logics,” in the sense of a set of underlying but often merely implied premises that ensure a certain functional but also cultural coherence for an ensemble of practices, it used to be argued that the cinema follows the major representational logic of the West since the Renaissance; namely, that of the central perspective as developed by architects such as Brunelleschi and Alberti in Florence around 1435, and elevated to the norm by painters like Masaccio, Mantegna, and Piero della Francesca. The peephole camera obscura that inspired the monocular cinematograph, the framed image and its implied use as a window on the world, also reflect “perspective” as the common symbolic form, not to mention how Cartesian optics (as well as the philosophy of mind inspired by it) became associated with just such a visual scheme, powerfully reproduced in the cone of sight emanating from the all-seeing (i.e., projecting and introjecting) eye.

The logic of the digital, by contrast, is neither visual-representational nor geometrically centered on a perceiving subject. It follows first of all the computational logic of algorithms—formalized routines or instructions for accomplishing predefined tasks (if . . . then)—that build up complex structures from simple ones through repetition, alternation, and amplification. Second, if we recall that one of the first practical uses of computers (besides cracking enemy code and calculating missile trajectories) was to work with spreadsheets, that is, as a program for manipulating a set of interdependent variables, then one inherent logic of the digital points to the conditional (what . . . if) as its natural dimension. This conditional mode may seem identical to the virtual but, in fact, belongs to a different paradigm, as long as the virtual is understood to be an optical-visual category such as in the pair “reality–illusion.” The conditional does, however, make simulation, emulation, and the playing through of possible scenarios a prominent feature of its modus operandi. Likewise, the complex interdependences in a spreadsheet of tabulated data (a “database”), linked and mutually reacting to each other, suggests a logic of connectivity and shareability, of filtering mechanisms and feedback loops that contrasts with the cinema’s linear cause-and-effect chains of sequentiality or continuity through contiguity. It also suggest a different temporal regime when compared to the delay, suspension, and deferral typical of narrative, in which these chains of linear data, constituted by a strict succession of individual still frames, are “sculpted” and modulated in time, in contrast to the primarily “spatial” or dispersive order of a database.

Judging by this account of “the cinematic” and “the digital,” there seems to be little or no convergence between their respective logics. The more surprising (and in need of explanation) therefore is the observation with which I started this section, namely the quasi-imperceptible transition from analog film production to digital techniques in order to achieve much the same effects: photographically credible representations of the perceptible world articulated through linear narrative. How then to reconcile
the conviction of some critics that there has been a radical, indeed, ontological break, and the impression by others that nothing much has changed in the cinematic experience: that it is still “business as usual,” both in a literal and a metaphorical sense? Initially, the vocabulary of postmodernism proved to be an attractive option, because it supplanted the discourses of rupture and epistemic breaks with those of transformations, mutation, and transitions, as expressed in terms such as pastiche, parody, reprise, and appropriation. These terms, borrowed from rhetoric and literature, helped to acknowledge the coexistence of analog and digital media practices and their mutual interference and dependencies, as well as the surprising kinds of survival and afterlife of apparently obsolete film forms and narrative formulas. Postmodernism seemed to explain the recycling and retrofitting of genres and stereotypes that made the film industry so “opportunistic” with regards to its rivals (radio, the music industry, television), but it also kept Hollywood’s adaptability to and readiness for innovative technology very high (via its special effects and event movies), even as it maintained itself as a stable and, in most respects, frustratingly conservative institution for more than nearly a hundred years. Since the 1990s, however, postmodernist cinema has been replaced by postclassical cinema or post-film cinema as terms coexisting but not synonymous with “digital cinema.”

Postproduction: Cinema Inside Out—from Harnessing Reality to Harvesting Reality

Yet something more fundamental is at stake in the filmmaking process of the digital age, namely a shift that seems innocuous enough but has far-reaching consequences: the change of emphasis from production to postproduction. It is innocuous if simply translated into the speed and convenience of digital (i.e., “nonlinear”) editing, which can now be done on a laptop thanks to some high-performance, off-the-shelf but nonetheless professional-standard editing software. It is also relatively innocuous if we think of digital postproduction in terms mainly of the higher degree of plasticity and manipulability of the images: what George Lucas has called the “sculpture” approach to the digital image. The more important point, however, is that a film created around postproduction has a different relation to the pre-filmic. Whereas analog filmmaking, centered on production, seeks to “capture” reality in order to “harness” it into a representation, digital filmmaking, conceived from postproduction, proceeds by way of “extracting” reality in order to “harvest” it. Instead of disclosure and revelation (the ontology of film from Jean Epstein to André Bazin, from Siegfried Kracauer to Stanley Cavell), postproduction treats the world as data to be processed or mined, as raw materials and resources to be exploited. In other words, the move from production to postproduction as the center of gravity of filmmaking is not primarily defined by a different relation to “reality” (as claimed in the argument around the loss of indexicality in the digital image). Rather, a mode of production, for which postproduction becomes the default value, changes more than mere procedure: it changes the cinema’s inner logic (and thus its ontology). The emphasis on postproduction made possible by the digital is fundamentally no longer based on
perception: its *visuality* is of the order of the *vegetal*: comparable to the growing, harvesting, extraction, and manipulation of genetic or molecular material in the processes of biogenetics or microengineering.

The implications extend to the way one approaches what is no doubt the feature most commonly associated with digital cinema: computer-generated special effects. Normally, these CGI effects are discussed under two headings: those that enhance the impression of reality but stay within the boundaries of verisimilitude and photographic realism (so-called invisible special effects, such as the waves, the smoke from the ship’s funnels, or the iceberg in James Cameron’s *Titanic* or the recreation of San Francisco’s 1970s waterfront for David Fincher’s *Zodiac*) and those that create a new reality altogether (visible special effects), such as impossible worlds (the *Star Wars* saga), “lost worlds” (the dinosaurs of *Jurassic Park*), and creatures from the future (Terminator II) and the past (the *Lord of the Rings* trilogy). It therefore makes more sense to understand all digital special effects as belonging to the category of objects extracted from the real and manipulated in their “genetic” structure, so that some images might be said to be like clones, whereas others are more like morphs or grafts, but all are, in a direct sense, digital “mutants” of the real, however “invisible” their mutations or “life-like” their appearance is to the eye. *Jurassic Park*’s predatory dinosaurs, for instance, are less retro-evolved from, say, rhinos or elephants, and instead are aggressive mutants of pick-up trucks, motorcycles, or earth-moving vehicles.

This comes close to Lev Manovich’s models for mapping change: extending his thinking about the “graphic mode” as the default value of the photographic mode, one can think of “animation” and “real-life action” as variants of each other, instead of—as has been the case in film history—opposites. Change from one medium to another happens, according to Manovich, “inside-out”: “One way in which change happens in nature, society, and culture is inside out. The internal structure changes first, and this change affects the visible skin only later.… Think of technology design in the twentieth century: typically a new type of machine was at first fitted within old, familiar skin: for instance, early twentieth century cars emulated the form of horse-drawn carriage. The familiar McLuhan’s idea that the new media first emulates old media is another example of this type of change. In this case, a new mode of media production, so to speak, is first used to support old structure of media organization, before the new structure emerges. For instance, first typesets book were designed to emulate hand-written books; cinema first emulated theatre; and so on.”37 This inside-out model has the advantage of adding a sense of the uncanny, of some malevolent act of disguise, indeed, of conjuring up the host-parasite image, as we know (and fear) it, for instance, from the *Aliens* films. When the new bursts forth, it may quite violently disrupt the previous ecology and force dramatic changes, also in terms of power relations. Manovich has made this perhaps even more explicit in another metaphor he uses, that of the “Velvet Revolutions” (after 1989) in the former Soviet satellite states, which may initially have been remarkably unbloody and peaceful, but whose long-term consequences have been very painful, with definite winners, losers, and many a “return of the repressed.” In each case, what emerges as the salient feature is how a new “logic” invades a system and takes over,
Digital cinema: convergence or contradiction?

Retrovirus-like, by leaving appearances intact but, in the meantime, hollowing out the foundations—technological as well as ontological—on which a certain medium or mode of representation was based. But it also makes room for and may explain what earlier I called “the poetics of obsolescence”: avant-garde artists merely enacting this inside out logic in softer, more contemplative forms. Both possibilities would suggest that digital cinema is not an oxymoron after all, but the mere shell of an obsolete cultural form whose function it now is to carry a new “life form” of the image into the next century. It is in this sense that “illusion,” too, takes on a new meaning.

Second Preliminary Conclusion: digital cinema “emulates” photographic cinema as one of its possibilities (and this is still the majority of its applications), but it obeys different logics. Economically, it is at the forefront of the new economy, which combines global conglomerates with “outsourcing” of services and talents (specialized software firms, start-ups, but also the independents, the festival circuits, and world cinema as talent pools); aesthetically, it is a return to “illusionism,” the aesthetics of astonishment that combines the sublime with the “real,” neither of which has much to do with “reality.” If photographic cinema followed the logic of imprint and trace, then the logic of digital cinema is computational: it extracts (“mines”) from the real certain “data” and “information,” which can be combined into a string of variables (“aggregated”) to make up a scenario: the real as special effect, or, more precisely, the computational program or script as a world, which turns the world into a script—a language or algorithm. At the same time, the cinematic and the digital generate different orders of subjectivity: if, in the Freudian view, the cinema spectator stands under the regime of “lack” and “absence” in relation to plenitude and presence or faces the incompatible and contradictory demands of “law” and “desire,” then the digital spectator has to negotiate the equally impossible orders of the “code” (mastery) and the “protocol” (constraint) and of predetermined interactivity masquerading as freedom and agency. The key point, if we follow Manovich, is that the logic of new media, and this includes digital cinema, has left behind not only photographic realism but also “simulation” as the model by which it produces the impression of (hyper-)reality. Instead of simulation, we have sampling, which is a quite different operation and derives from information theory and communication, not from image-making and representation. Although it originated from (popular) music, sampling goes much further: it is compatible with cognitivism and neuroscience; that is, it mimics the way our brains process information intermittently rather than as a continuous flow. The analogies with the traditional arts/media (music, sculpture, painting) overlook the more basic process at work: reality is raw material, from which data are extracted in order to be reassembled according to certain principles, schema, and templates; activated in view of certain goals; and judged by their results. We are in the world of postproduction, whose principles might be visualization, but, in most cases, they will be related to other meta-data structures (selection, filtering, modularization, etc.) that are useful for other purposes, and where visualization is only an intermediary or interface, maintained for human convenience. However, the second characteristic identified by Manovich is equally if not more important: in digital cinema, all representations are mapped on a 3D digital environment, irrespective of whether the
reality is a 3D real-world space or a 2D pictorial space: the default value of all digital representation, including the cinema, has become 3D computer graphics. This—together with the nonentertainment uses of such visualization for military, medical, and/or monitoring purposes—is the bridge that takes us from analog cinema to digital cinema and from digital cinema to augmented reality.

Coda: Perspective Corrections

Does this mean that we should endorse, after all, the “death of cinema” or rather accept its historical function as an intermediary—some have even called it an “intermezzo” and a “detour”—between the visualization of natural phenomena previously imperceptible to the human eye (chronophotography as understood by Eadweard Muybridge and Etienne-Jules Marey) and the coding, compression, and transmission of information graspable by the human mind (of which narrative cinema has until now been the historically contingent “database” and “memory” because it inscribes the perceiving observer into the impersonal data flow)? It may not be an altogether implausible scenario, but it would underestimate the extent to which digital cinema is both a symptom and an agent, the shell and the incubator of what, at the outset, I called a “second Renaissance” and a “soft revolution.”

The last major cultural shift in the default values of Western visual perception was, precisely, the introduction of the central perspective, beginning in the 1450s in Italy and generally identified with the European Renaissance. However, whereas in the fifteenth century it was the religious painters who acted as the mediators of the new ways of seeing: first depicting Heaven and the Almighty in altar pieces and then far-distant sights, producing a possibly unintended consequence: namely, that perspectival projection, which after all, had God as the vanishing point to secure the validity of representation, de facto contributed to secularization. Today, by contrast, it is popular entertainment and the movie industry that act as a kind of metaphysical template or interface, with perhaps equally unintended or at least unpredictable consequences.

Consider the following: the extension of our spatially configured visual and aural environment, such as we experience it in data-rich augmented realities, is symptomatic of the rise of the surveillance paradigm, which—taken in its widest sense—is materially affecting our understanding and engagement with images and visual information off- and online: in either case, to see is to be seen, to act is to be tracked. Digital cinema, insofar as it participates in this hybridity of visualization, vitalization, and action, plays a duplicitous role. Although it cognitively and bodily empowers users and spectators, it increasingly releases them from responsibility and consequence: an ethical challenge we are only beginning to become aware of. On the other hand, once images are no longer considered by our culture as views (i.e., something to be looked at or contemplated) but more like clues (i.e., as instructions for action), then they undo something
that Renaissance perspective accomplished; namely, they banish the magic powers of images to act and be acted upon, which religion could make use of as long as their virtual presence was a function of their fixture to an actual site (e.g., as murals and frescos in churches or monasteries). What is now being instrumentalized is a different kind of agency in images, perhaps no less magical (in their effects of contagion, mimetic embodiment, animation, simulation of emergency, and intervention), when the management of digital information unites the “military-entertainment complex” with industry, finance, and government but also rules our daily lives thanks to smartphones, handheld devices, and augmented reality glasses.

If digital cinema implies that we are now once again sharing the same physical space with the image and are no longer separated by a frame (whether functioning as window [i.e., realism] or mirror [i.e., reflexivity]), then notions of representation and self-reference, both key elements of Renaissance perspectival space, would have to be abandoned. We would indeed experience a shift in paradigm and episteme, one for which the artist Hito Steyerl has coined the term “vertical perspective”: “Imagine you are falling. But there is no ground.” What, in the context of the revival of 3D, I described as horizonless images, where floating and gliding are more appropriate than sitting or standing upright, Steyerl radicalizes into “being in free fall,” arguing that, while falling, one feels as if one is floating or not moving at all because: “falling is relational: if there is nothing to fall towards, you may not even be aware that you are falling…. Whole societies may be falling just as you are. And it may actually feel like perfect stasis.” Steyerl goes on to explain: “Our sense of spatial and temporal orientation has changed dramatically in recent years, prompted by new technologies of surveillance, tracking, and targeting. One of the symptoms of this transformation is the growing importance of aerial views: overviews, Google Map views, satellite views. We are growing increasingly accustomed to what used to be called a God’s-eye view. On the other hand, we also notice the decreasing importance of a paradigm of visuality that has long dominated our vision: linear perspective. Its stable and single point of view is being supplemented (and often replaced) by multiple perspectives, overlapping windows, distorted flight lines, and divergent vanishing points.”

Vertical perspective inaugurates a free-floating presence, immaterial and invisible, as well as ubiquitous and omnipresent. As symbolic form or new episteme, it is as much a set of formalized conventions as was linear monocular perspective when it pretended that the earth was flat and man was the only creature that mattered in the eyes of God. Now the sense of ubiquity, simultaneity, and omnipresence compensates for being a mere speck in the universe, enmeshed in networks of plotted coordinates, trackable and traceable at every point in space or time, and suspended in an undulating, mobile, variable inside to which no longer corresponds any outside, however vast, rich, connected, or proliferating one imagines such an inside (or online) world to be. Digital cinema would then be the name for an inside-out process, of which its apparent contradiction in terms merely signals certain parallax views and perspective corrections.
To sum up by way of several tentative conclusions: We can think about digital cinema in terms of three distinct but interlocking logics:

1. The aesthetic logic: digital cinema obliges one to rethink the cinema’s relation to truth, evidence, disclosure. With the digital as the “new normal,” all kinds of poetics of obsolescence come alive regarding production of presence, as well as the performativity of the authentic and the real. The aesthetic battles concern the definition of what cinema is: projection and transparency, the auditorium and a darkened room, a social space and a social experience, the framed image as “window and view” or the horizonless space-time of “verticity and free fall.”

2. The socioeconomic logic: digitization is not only a new way of generating images and of signal conversion. It has, via the internet, streaming video, downloads, social networks, and YouTube, created new distribution platforms; new forums of information and circulation; the collapse of the barriers between private and public; bleeding the “experience cinema” into history, memory, politics, and the public sphere. But it has also created new business models, offering “services” that are “free” and that have to recover their cost at another level (security, registration, surveillance, data generation, and data mining for prediction, premediation, and risk-assessment; i.e., the very opposite of memory, remediation, and conservation). In contrast to its aesthetics, digital cinema’s economics as “service” rather than “work” or “product” obliges us to abandon the top-down “vertical” structures of the film industry and think in a more “horizontal,” distributive way—as outlined by the proponents of convergence.

3. The historical logic: digital cinema embodies the philosophical paradox of everything changing so that everything can stay the same. It raises the question of how change happens, once we no longer believe in linear causality, in single agents or single events, or rely on teleology and grand narratives. In response to the end of the modern episteme, the humanities have adopted explanatory models that are allegorical and philological (Walter Benjamin, deconstruction), postmodern (repetition, reenactment), biological and evolutionary (contagion, swarm, stochastic, or rhizomatic proliferation).

I have suggested adding to these another kind of logic and a different dynamic: that of the inside-out, as mentioned by Manovich, or the life form kernel covered by the obso-lete but essential shell. It tries to understand how a semantic contradiction or oxymoron like “digital cinema” actually functions as a motor for change, precisely because it appears as a contradiction: it carries the old forward while incubating the new, by a move that acknowledges the past’s existence but defangs and transforms it in the very act of perpetuating it. In this way, digital cinema assures us that it is business as usual and there is nothing new under the sun, while pushing us to partake in one of the most dynamic and turbulent periods of human history, undergoing the sort of transformations that future generations will record as a radical break: a revolution and a renais-sance at the same time.
Notes

1. The world’s stock exchanges, the movement of currencies and commodities, of labor and services, or the manufacture of weapons and the technologies of warfare would have been as decisively altered even without digital sound and images. Which is not to say that warfare and cinema or global trading and television do not have profound aspects in common. See Paul Virilio, *War and Cinema: The Logics of Perception* (London: Verso, 1988) or Pat Mellencamp, ed., *Logics of Television* (Bloomington: Indiana University Press, 1990).


3. On the notion of a second Renaissance, see Henry Jenkins: “I use concepts of media- and cultural convergence to describe the present moment as a kind of Renaissance culture, one being transformed—for both better and worse—as the social, cultural, political, and legal institutions respond to the destabilization created by media change. Among the topics I have addressed have been digital media’s impact on Journalism, the emergence of new forms of global culture, the potentials of interactive television, the production of knowledge in an information rich environment, the emergence of new youth cultures in cyberspace, and the impact of digital media on our understanding of intellectual property.” Henry Jenkins, “Convergence? I Diverge,” *Technology Review*, June 2001 (http://www.technologyreview.com/article/401042/convergence-i-diverge/).

4. Ibid.


6. The field of media theorists is split on this issue. There are out-and-out technicists, such as Friedrich Kittler, who hold that human beings adapt very quickly to new technologies, and convinced culturalists, such as Sean Cubitt or Mark Hansen, who see culture shaping technology more than the other way round. The debate between those who believe in the determining force of changes in perception (in line with Benjamin, Foucault, or Virilio) and those cognitivists (Bordwell, Grodal) who think that the human sensorium has not changed in the last thirty-five millennia similarly polarizes this issue of technological determination.

7. Jenkins, “Convergence?—I Diverge.”

8. Ibid.

9. Ibid.


11. “The paperless office is about as likely as the paperless toilet” (attributed to Keith Davidson of Xplor International. http://www.pcmag.com/encyclopedia_term/o,1237,t=paperless+office&it=48808,00.asp.

12. One lesson of early cinema studies: there is no single event/invention, nor even multiple origins; the prehistory of cinema is being rewritten every twenty years or so, depending on the pressing issues of the day.

14. The remote control may have changed the structure of television programming even more decisively than cable and the VCR, affecting the genres, pace, and mode of address of television, while also making its impact on film form, as we shall see. Cable and satellite reception also managed to break up the institutional arrangement of television, especially in Europe, by not only extending the overall amount of choice, but by taking control over this choice increasingly out of the hands and guidelines of governments, which until then had largely policed access. This push in the direction of commercial criteria for choice and selection brings television once more closer to the cinema and already points in the direction of the internet.

15. The French filmmaker Bruno Dumont begged an audience to see his film *Hors Satan* on 35mm: “We are made of chemistry, and film stock is made of chemistry, hence we react to each other in a unique way, chemistry against chemistry, which isn't possible with the digital.” Quoted in the editorial of *Cahiers du Cinéma*, no. 672 (November 2011), asking: “This metaphor by Dumont, 'chemistry against chemistry,' is it just mythology or does it contain a grain of truth?” (my translation) http://www.cahiersducinema.com/Novembre-2011-no672,1985.html.

16. From an industry perspective, convergence sounds as follows: “Sir Howard Stringer, chairman and chief executive of Sony Corp America has called 2004 'the year of convergence.' He sees the growth of broadband connected TVs, PVRs, PlayStations, mobile phones, MP3 players and so on as a way for converged companies, or loose alliances of companies, to bridge the gap between content and consumer. 'We will no longer need a permit from the gatekeepers when we want to reach the consumer,' he says.” Kate Bulkley, “Better Late Than Never,” *The Guardian*, May 14, 2004, http://www.guardian.co.uk/media/2004/may/14/digitalmedia.

17. Jenkins is well aware of this contested terrain: “Approaches derived from the study of political economy may, perhaps, provide the best vocabulary for discussing media convergence, while cultural studies language has historically framed our understanding of participatory culture. Neither theoretical tradition, however, can truly speak to what happens at the intersection between the two. The result may be conflict (as in ongoing legal battles for access to or regulation over intellectual property rights), critique (as in the political activism of culture jammers who use participatory culture to break down the dominance of the media industries), challenge (as occurs with the blurring of the lines between professional and amateur products that may now compete for viewer interest if not revenues), collaboration (as in various plans for the incorporation of viewer-generated materials), or recruitment (as when commercial producers use the amateur media as a training ground or testing ground for emerging ideas and talent).” Jenkins, “Convergence?—I Diverge.”

18. The digital revolution in image conversion has been lagging behind the conversion/convergence in recorded sound. Electronic music, both avant garde and pop, had experimented with (and embraced) the computer much earlier than video artists or filmmakers. Already in the early 1980s, the Musical Instrument Digital Interface (MIDI) was adopted as an industry standard, enabling digital musical instruments and computers to communicate with each other. See Paul M. Craner, “New Tool for an Ancient Art: The Computer and Music,” *Computers and the Humanities* 25, no. 5 (October 1991): 303–313.


20. In practice, of course, there is loss of information, as data get compressed or transferred to other platforms and formats. See internet entries on “lossless compression”
22. The distinction between autographic versus allographic was first made in Nelson Goodman, The Languages of Art: An Approach to a Theory of Symbols (Indianapolis: Bobbs-Merrill, 1976), 113.
24. The history of sound in the cinema has in recent decades become a fertile research area, thanks to the work of Rick Altman, Doug Gomery, James Lastra, Michel Chion, Claudia Gorbman, Mary Ann Doane, Kaja Silverman, and many others. For sound and the “New Hollywood,” see Gianluca Sergi, The Dolby Era: Film Sound in Contemporary Hollywood (Manchester: Manchester University Press, 2004).
28. In the person of Walter Murch, sound design, film editing, and sound mixing became one integral craft, almost as important as that of the director. See Walter Murch, In the Blink of an Eye: A Perspective on Film Editing (Beverly Hills, CA: Silman-James Press, 2001).
29. Six years earlier, in June 1999, Lucas had opened a previous Star Wars episode in four digitally equipped theatres: “For the first time in motion picture history, a widely released feature film will be made available to moviegoers via digital projection. CineComm Digital Cinema and Texas Instruments, two of the industry’s leading forces in digital projection of motion pictures, will provide their digital projector technology to screen Star Wars: Episode I The Phantom Menace on two screens in Los Angeles and two screens in New York.” http://www.projectorcentral.com/news_story_94.htm.
31. Ibid.
32. According to the Art History Archive, “Video art is often said to have begun when Nam June Paik used his new Sony Portapak to shoot footage of Pope Paul VI’s procession through New York City in the autumn of 1965. That same day, across town in a Greenwich Village cafe, Paik played the tapes and video art was born. This fact is sometimes disputed, however, due to the fact that the first Sony Portapak, the Videorover did not become commercially available until 1967.” See http://www.arthistoryarchive.com/arthistory/videoart/ (accessed October 28, 2012). Paik most likely shot the exterior footage of the Pope with a mains-powered deck (corded, non–battery operated deck) and then brought the tapes to a studio. See also Doug Hall and Sally Jo Fifer, eds., Illuminating Video: An Essential Guide to Video Art (New York: Aperture, 1987) and Gary Schwartz, ed., The Luminous Image (Amsterdam: Stedelijk Museum, 1984).
33. See Michael Snow’s reworking of several of his landmark works in digital formats and as installations; for example, his WVLNT (Wavelength For Those Who Don’t Have the Time) from 2003, shown as an installation at the Whitney Biennial 2008.


36. The obverse of digital malleability and metamorphosis is that the image can seem “out of joint.” Things may feel too big or too small, too luridly colored or too flattened to monotones, too smooth or too shiny, too fast or too slow, too irregular or too continuous. Although “faults” in a normative register, these effects can be an aesthetic resource, by providing the suspense, the dissonance, or disequilibrium that every narrative needs to engage the spectator.


40. In a quite remarkable (and so far little remarked upon) reversal, President Obama has in the 2012 election campaign been compared not—as he was in 2008—to Abraham Lincoln or FDR, but to Paul Newman, as the ideal role model and salient parallel. See Maureen Dodd, “The Ungrateful President,” *New York Times*, August 7, 2012, http://www.nytimes.com/2012/08/08/opinion/dowd-the-ungrateful-president.html.

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