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ABSTRACT
This essay constitutes the epilogue to the forthcoming book *Film History as Media Archaeology – Tracing Digital Cinema*, Thomas Elsaesser's collected essays on media archaeology. In this essay, Elsaesser reflects upon the previous 25 years of research into media archaeology, highlighting its methods, terminology and problematic status as a discipline.

If Media Archaeology has been a catchword in the fields of film studies and media studies for almost three decades now, then the amount of attention and degree of acceptance accorded to it has increased exponentially over the past ten years. The essays presented in *Film History as Media Archaeology – Tracking Digital Cinema* (Elsaesser 2016) cover general reflections and specific case studies written over a period of some twenty-five years, often tackling similar questions, exploring them from different perspectives, but always keeping the focus of media archaeology on the cinema as an extraordinary mutable phenomenon, impossible to fix and yet firmly established in our culture and its imaginary for at least one hundred years. What I want to present here is a recapitulation of some of the main arguments, by way of an epilogue, which turns out to be also something of a retrospect, in the sense that Media Archaeology's own status – as method, as practice, as a potential discipline – may have to come under scrutiny.

During those twenty-five years, a number of books have been published carrying *Media Archaeology* in the title, notably Erkki Huhtamo and Jussi Parikka's edited volume *Media Archaeology: Approaches, Applications and Implications* (2011) and Jussi Parikka's *What is Media Archaeology?* (2012). Several books by Siegfried Zielinski (*Audiovisions* [1999] *Deep Time of Media* [2006]) also consider themselves directly contributing to the question 'what is media archaeology?', and so does a collection of essays by Wolfgang Ernst entitled *Digital*

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Memory and the Archive (2013). In recent years, the number of articles, book reviews and special issues on Media Archaeology have augmented the scope and intensified the debate.[1]

Casting one's net a little wider, one should add that some of the most intensely read and extensively reviewed books in recent years, such as Jonathan Crary's *Techniques of the Observer* (1990), Mary Ann Doane's *The Emergence of Cinematic Time* (2002) and Jay David Bolter/Richard Grusin's *Remediation* (1998), as well as Lev Manovich's *The Language of New Media* (2001) all breathe the spirit of Media Archaeology, even where they do not carry the words in the title or indeed use them in the text.

Such sudden popularity has not gone without discontent, critique and out-right rejection, not only from professional archaeologists or, on the other side of the divide, from social and cultural historians, but also from within the fields most directly affected and addressed by media archaeology, such as cinema studies, film history, media studies, media-theory and art history. Without going into details, one can summarize their disquiet and points of contention by saying that the problem most keenly felt is that there is no discernible method-ology and no common objective to media archaeology.[2] And that consequently, there seems to be no persuasive or pertinent formulation of the problem that media archaeology is supposed to address, and no specific research agenda by which its success might be measured or its value assessed.[3]

The counter-argument by a number of media archaeologists, including Huhtamo and Parikka, is that this is precisely its strength and value: that the research is heterogeneous and diverse, that the method is deconstructive and non-normative, that its aims are to be subversive and resistant, and that media archaeology is a travelling discipline without fixed boundaries. Such claims are useful in creating some leg- and elbow- room in the crowded environment of contemporary media 'theory', but they can also look a little overblown, for instance, when Huhtamo and Parikka assert that 'a wide array of ideas have provided inspiration for media archaeology' and then enumerate: 'Theories of cultural materialism, discourse analysis, notions of nonlinear temporalities, theories of gender, postcolonial studies, visual anthropology, media anthropol-ogy, and philosophies of neo-nomadism all belong to the mix' (2011, 2). This is giving the enemy (too) much ammunition to snipe with.

One way to clarify this situation was to point to several key thinkers as refer-ence points: Always mentioned are Michel Foucault and Walter Benjamin, and almost as frequently, the mercurial influence of Friedrich Kittler, even though Kittler himself strenuously avoided calling what he did media archaeology, at least during his lifetime. He preferred to 'drive the human out of the humanities' (1980). But these writers are helpful in setting up a kind of intellectual duopoly between a 'French' and a 'German' paternity for media archaeology which is further strengthened by pointing to the many areas of overlaps, not least the

common – in each intellectual tradition differently interpreted – philosophical legacy of Friedrich Nietzsche and Martin Heidegger.

We saw how media archaeology means different things to different practitioners, but nonetheless, a certain consensus has emerged: besides the discontent with linear narratives of the 'from … to' variety, the need to 'read [media history] against the grain', to provide 'friction', uncover 'layers', 'probe strata' and to 'dig out' forgotten, suppressed and neglected histories, there is also a strong sense/consensus that one should be 'doing media archaeology' rather than merely using it as a conceptual tool. Finally, there is also the suggestion that an archaeological approach to the past of media (looking at media phenomena in their material-technical manifestation as fragments of physical and imaginary worlds no longer available) will clear a perspective: not so much for the use of the present (where *harvesting the past* can become an act of appropriation), but for thinking a different kind of future.[4]

While sympathetic to almost all of these objectives, and especially interested in the way media archaeology reconfigures the temporalities of past and future, I have been less concerned with defining 'what is media archaeology?', and have asked myself 'why media archaeology (now)?': thus neither 'doing' media archaeology with original or practical research, nor promoting it as a panacea for the various problems now besetting the study of cinema. Instead, I have been inclined to treat media archaeology as a *symptom* rather than a *method*, as a *place-holder* rather than a *research programme*, as a *response to various kinds of crises*, rather than as a *breakthrough innovative discipline*, and I am asking myself to what extent is media archaeology itself an *ideology*, rather than a way of generating *new kinds of secure knowledge*.

This may be an unexpectedly challenging way of closing a book dedicated to establishing media archaeology as an important research area, but it seems the only productive way of advancing the debate if media archaeology is to prove viable. In response to 'why media archaeology (now)?' I have offered three key sites or configurations that have led to its emergence, as well to its function as a symptom:

(1) The rediscovery of Early Cinema as part of a complex visual culture, with its own traditions, rules and logic (i.e. presenting itself as a distinct 'episteme'), which would be seriously misread, if understood merely in relation to what followed (e.g. as classical narrative cinema's 'pre-history'). If treated *sui generis*, Early Cinema can open up illuminating perspectives and surprising parallels, especially when viewed from the present situation of equally rapid changes in the overall media-scape.

(2) The present situation thus provides a second site that favoured a media-archaeological approach, since digital media, too, confronts one with several points of rupture and discontinuities that require a historiographic 'perspective correction'. Among the points of rupture

was the swift adoption and quasi-universal acceptance of digital media across the arts and in daily life. Not just cinema, music or writing (i.e. the entertainment, education and information media) took to the Internet and became global, so did business, commerce, finance and trans-border communication. Equally surprising was that neo-liberalism and political conservatism adopted the discourse of 'disruption' around digital technologies. What once was the rhetoric of the counter-culture was now 'business as usual', because, as usual, it was (a) business. In the face of this rush into the digital, is media archaeology hitting the brakes or stepping on the accelerator?

(3) A further site for media-archaeology (in the form of what I call a 'poetics of obsolescence') was the entry of moving image-based art in the museums, galleries and arts spaces generally, coinciding with the centenary of cinema, with frequent pronouncements of the 'death of cinema', while coming after some sixty years of tense relations, with often hostile stand-offs between the art world and the film world, and especially during the ferment of the 1970s even between museums of modern art and the film avant-garde.

These three sites are very heterogeneous, differently located, and attract uneven kinds of notice in both the academic fields of film and media studies, and in the public sphere of media reception and perception. Nonetheless, they are interconnected and at times mutually determining, even in their antagonisms.

For many of us, the rediscovery of Early Cinema began in the mid-1970s. Often cited is the 34th congress of the *Fédération Internationale des Archives du Film* (FIAF) in Brighton in 1978, devoted to 'Cinema 1900–1906'. One of the impulses, which made the event so significant, was that it managed to rally scholarly and public support for the salvage of (nitrate) film material. Rapidly deteriorating physically, the films from the early decades needed large injections of funds in order to be properly preserved and to be recognized as valuable not just for film scholars but as national and international cultural patrimony. Alongside the archivists who gathered in Brighton, film historians and film scholars were invited to join, almost for the first time in FIAF's existence. The rest, as they say, is history – or rather, the rest is 'media archaeology'. Because among these scholars were some – Noël Burch, Tom Gunning, André Gaudreault, Charles Musser (to name only four)[5] – who inaugurated paradigm changes in our understanding of the cinema, and not just its earliest period and its so-called pre-history. In subsequent years, especially since the 1990s, annual festivals like the *Giornate del cinema muto* in Pordenone and *Il cinema ritrovato* in Bologna made the study of this period immense fun, intellectually fertile and (dare I say) internationally fashionable.

The circumstances of its coming properly into view meant that 'early cinema' – later renamed 'the cinema of attractions' – was not only a descriptive term, but also polemical in intent and militant in its effect: a militancy that

media archaeology wanted to inherit, with its claim to counter-histories. Since traditional film history tended to be linear accounts, relying on 'organicist' models of birth, adolescence, maturity, decline and renewal, the first 20 years of cinema initially fared badly, partly out of ignorance, partly because up to 80% of the films had perished, but partly also because the historiographical models then in use. These consigned the period – when narrowed down to a single medium, rather than taking in the entire media-scape – to the stage of infancy and the status of the primitive. Thus, even the few films that were known and had survived were de or undervalued, because they were measured by inappropriate categories, wrong assumptions and false expectations. Given their focus on one medium, their reliance on conjecture, but perhaps most of all, their (by no means dishonourable) aim to establish the cinema as a legitimate art form, historians had much of this early history 'wrong', both factually and by omission. A far too restricted set of causal determinants, a much too narrowly self-selected cast of players and a disregard for the sophistication and diversity of the media technologies flourishing in close proximity to the cinema, made those who identified with the 'new film history' or 'revisionist film history' feel they had better 'start from scratch'.[6] Laying the groundwork of what became media archaeology with respect to the cinema, this new generation of scholars began rethinking how the cinema had emerged, how many hands and brains (but also non-human agents and fortuitous factors) had actually been involved in 'inventing' it, and above all, what exactly was it that was invented around 1895 and eventually given the name 'cinema'. Thus, the 'great man' theory of history was out: Burch and Musser championed the then barely known Edwin S. Porter over both the world-famous Thomas A. Edison and D.W. Griffith, while the questions 'where is cinema' and 'when is cinema' were already raised from the start.

An example of omission in the service of establishing the cinema as art would be the implicit teleology of greater and greater realism, and the insistence on linear narrative (continuity editing and cross cutting) as more 'natural' and 'mature'. Whenever a historian tried to map the cinema's progress as additive, i.e. developing from silent and black-and-white to sound and colour, from rectangular screen to cinemascope and IMAX, and from 2-D to 3-D, a fairly naive notion of realism was in place.[7] Yet, the knowledge that early films were often in colour, cinema performances were rarely silent, that there were giant screens around 1900, and there was 3-D (stereoscope) before there was 2-D was not so much absent, but ignored or suppressed, because an inconvenience to the ideological project.[8] For example, a vivid debate ensued over two versions of Porter's *Life of an American Fireman* (1903), one of which used crosscutting to drive the action forward, while the other used parallel editing and repetition to establish distinct points of view. The more linear one, held by the Museum of Modern Art, turned out to be a later re-edition to make it seem more 'modern', which is to say, more normative in relation to post-Griffith storytelling practice.

What was lost was the knowledge of the 'external' narrative point of view (the performative or 'monstrative' character of early cinema), which for instance, pointed to the possible presence of a film lecturer, a vital aspect of early cinema practice, whose textual evidence the well-meant 'improvements' obliterated.[9]

In short, it was not only a matter of more research, preservation of and access to extant films or freshly verified facts, but new historiographic models were needed for evaluating this early period: one that could cope with non-linear developments, with inconsistencies and open questions, with apparent breaks and dead ends, and which was able and willing to see the cinema within broader media-formations that could place very different phenomena – as well as the different media – into specific historical contexts. These contexts were the emerging and evolving constellations of media use that included all manner of entertainment venues but also encompassed non-entertainment purposes for the cinematograph.[10] In other words, early cinema studies also dared to ask whether the cinema had to be defined as a predominantly storytelling medium, or whether other ways of deploying the cinematic apparatus had also been important for its history and development. For instance, while the revisionist historians' approach was to say: 'for some problems in film history, it is better not to watch films' (in order to draw attention to the industrial, technological and financial infrastructure of cinema as determining factors even for the development of its aesthetic forms), one of my media-archaeological slogans was 'the cinema has many histories, not all of which belong to the movies' – by which I meant to make room, among other things, also for re-evaluating the non-canonical holdings of film archives, including the vast array of scientific and medical films, of home movies and instructional films. These, in turn, would prove to be a veritable gold mine for video and installation artists, giving rise to the different genres of the 'found footage' film, the essay film and other modes of recycling, repurposing and appropriating of the filmic patrimony, the photographic archive and the cinematic heritage.[11]

However, even before digitisation had the impact it did, there was sufficient reason to question the historiographical models in use in film and media studies. While this book has focused on the seismic shifts which the rediscovery of the first twenty years of the cinema were to force on to film history, by correlating them above all with the equally dramatic changes wrought by digital media, it should not be forgotten that among the scholars, whom I identified with the 'New Film History' many were applying new research tools, pattern analytics and cross-media perspectives also to problems and periods other than early cinema. A field for major revisions was the history of film sound and the so-called transition to sound in the late 1920s, now seen in context and competition with radio and the emerging gramophone industry (as also indicated in several essays in this volume).[12]

A similar shift in method and perspective occurred in the historiography of the American cinema of the post Second World War years. The very rapid

implementation of new technologies in film-making during the late 1940s and 1950s, such as colour, wide-screen formats, new lenses, 3-D, but also hand-held camera-work and portable audio-recording, along with alternative exhibition practices such as drive-in cinemas and art-houses, could not be accounted for with reference to some internal logic of cinema or specific goal-oriented strategy. The period required a broader media-historical perspective, where change occurred in response to the competition with television and to other leisure opportunities provided by the motorcar and portable music devices, including the transistor radio. Another 'new film history' area of reinvestigation which had a major impact, changing our understanding of a whole period and proving innovative with respect to film historiography, were the decades between 1965 and 1980. At issue was the vexed question of the demise of the studio system in the mid-1960s, the emergence of a 'New Hollywood' in the 1970s and the resurgence of a new 'Global Hollywood' of blockbusters, event movies and superhero franchises in the 1980s.[13]

Such uneven developments and contradictory transitions had to be plotted against the background of both emergency measures and maintaining continuity, rather than following any kind of *telos* or overall master plan. If the challenges of television, new business models in the film and media industries, changes in censorship and state control did not make for a clear causal scheme, they also did not constitute radical breaks, nor did they suggest media convergence. At first, antagonistic models of competition and rivalry seemed most appropriate, but as the cinema-television battle mutated into cooperation, division of labour and all manner of 'synergies' across the different media through conglomerate ownership and the pooling of talent and resources (some of which came down to containing television within a reinvented studio-system), more sophisticated models of interaction were needed, one of which – that of the logic of the supplement – I proposed in 'The 'Return' of 3-D' (2013; reprinted in *Film History as Media Archaeology – Tracking Digital Cinema*).[14]

None of these revisionist historians would call themselves media archaeologists, and yet the pressures to rethink historiography and causality were not dissimilar. Thus, in some disciplines, such as literature and architecture, but also cultural studies and media studies, the vocabulary of postmodernism came to replace Foucault, because it supplanted the discourses of rupture and epistemic breaks with the 'softer' ones of intertextuality and remediation, of pastiche and allusionism, of emulation and appropriation. These concepts helped to accommodate (if not always to adequately comprehend) the coexistence of the different media, their mutual interference and interdependencies, as well as the surprising kinds of survival and afterlife of film forms and narrative formulas, the recycling and retrofitting of genres and stereotypes that made the film industry at once so 'opportunistic' with regards to its rivals (radio, the music industry, television) but also so adaptable, with regards to changing tastes and expanding markets: keeping, for instance, Hollywood's prestige for (technical) innovation

high even as it maintained a surprisingly stable practice (with respect to its product) over close to a hundred years. More than digitization as such (and in some cases, preceding it), it was the growing interpenetration of cinema, television and the new media delivery and distribution systems – embodied in the remote control, the time shifting of the video-recorder and the individual ownership of a film thanks to the videotape, and later DVD – that demanded rethinking historiographical models and revising mono-causal explanations and single-media genealogies.

Media archaeology as crisis management

It should be clear by now that Media Archaeology can also be regarded as a symptom responding to a number of crises, several of which extend well beyond the scope of cinema and indeed media in general. Most prominent among these crises is the loss of belief in 'progress', i.e. the critique of the Enlightenment, as it has been formulated by Max Horkheimer and Theodor W. Adorno's *Dialectics of Enlightenment* (2002), Jean François Lyotard's *The Postmodern Condition* (1984), Jacques Derrida's critique of logocentrism (*Of Grammatology* [1976]) and other major European thinkers in the last half of the twentieth century. Almost every writer's definitions of Media Archaeology includes an objection to teleology and linearity, doubts that have their common root in this loss of faith in unlimited progress and human self-perfection. This philosophical critique –aligned, as in Lyotard, with the 'end of [other] grand narratives' argument – became conspicuous after the failure of May 68 in Western Europe and almost commonplace after the collapse of Communism in Central and Eastern Europe in 1989. In the new millennium, it has turned once more urgent by being linked to explicitly ecological concerns about the sustainability of the 'growth and production' model of neoliberal capitalism. Flowing from this loss of faith in progress (but also philosophically distinct from it) is the *crisis in history and causality*, which has amplified into a *crisis in memory and recall*, reflected in turn in the *crisis of narrative and storytelling*. More specifically related to the cinema and to the question I posed in the introduction, namely that film history as media archaeology also challenges me to ask: 'what is cinema (good) for', is another crisis – the *crisis of representation and the image*.

As it is one of the purposes of this essay to speculate on the cinema's place in the wider scheme of things, I need to comment on one or two of these crises, hoping to extract from them insights into possible alternative genealogies of the cinema that media archaeology can point to or delineate. I shall be trying make good the promise that by approaching the past as an archaeological 'site' one can discover the material remains of bold thoughts, eccentric ideas and brave hopes that encourage one to entertain the vision of a different future from the one already prepared, processed and pre-mediated for us.[15] Such expectations of renewal and redemption, of course, reflect the reverse side of the loss of faith in

progress, namely the pragmatism of cost-benefit calculus, and the hedonism of living in the here-and-now, substituting itself for those broken, abandoned and grounded utopias littering the ninteenth and twentieth century, of which media archaeology imagines itself to be the collector, preserver and place-holder.

I will here briefly dwell on the crisis of causality (as part of a different historiography), and on the crisis of representation (as part of the cinema freeing itself from its own erstwhile self-definitions). We saw that one of the key characteristics of media archaeology whether centred on early cinema or taking its cue from digital media was the attempt to break with models of linear history, which also meant challenging Newtonian notions of causality, where actions and events are plotted along a single continuum of cause and effect. A Kittlerian line of attack – extrapolating from Foucault – was to argue that a historiography that relies on chronological narratives merely reflects the cultural technology of writing and script, and thus is based on print as its medium, thereby proving itself not to be universal or necessarily true, but historically determined.[16] If historians have – until quite recently – been reluctant to accept as valid evidence material that could not be presented in the form of written documents or printed sources, this surely cannot be right for media history, at least not a media history that encompasses the technical media of cinema, the electric media of television and telephony, and the electronic-algorithmic media of the digital era.

At first glance, a break-up of mono-causality would appear to be a liberating moment, one that takes more accurate account of contingency in human affairs, and of actions having unforeseen consequences. However, the same logic that tries to overturn linearity by pointing to its technological underpinnings, applies to the philosophical, psychological or political arguments that favour 'contingency as our new causality'. They are at least in part also the superstructural elaborations – the ideology, to use this old-fashioned term – of the technologies that are now in use and that we are increasingly dependent upon. On the other hand, such a charge of ideology can overlook the extent to which changes in our idea of causation are also due to different environmental challenges or may arise in order to meet specific practical problems, as argued below.

Underlying the charge of 'ideology' would be a version of 'technological determinism'. A change in media technology, so the determinist argument would go, will invariably bring with it a change in models of reality, of the mind and of the conceptual means by which we interpret both mind and reality. No universe as a clockwork and God as a watchmaker without the mechanical timepiece; no Descartes dividing the world into *res cogitans* and *res extensa* without the telescope. By the same reasoning, the contemporary preference for coincidence and contingency over linear cause and effect chains aligns itself with such eminently cinematic techniques as montage and the cut, indicative

of the presence of the cinema (as a media technology), even where it is not explicitly invoked.

Extending such techno-determinism into the digital, might there also be suggestive parallels between 'repetition and difference' as a way of deconstructing history (as both Gilles Deleuze and Niklas Luhmann have done), and the manner in which digital images do not follow each other in succession, but remain the same and are merely 'refreshed', with only a portion of the pixels being replaced with different numerical values? Speaking generally, the use of causally motivated narrative for rendering and retaining the past in the form of history is – in media archaeological terms – a relatively recent attainment,[17] compared with the much longer prevalence of the memory arts, of history in the form of myths, allegories, memoirs, sagas and chronicles – all of which often function in non-linear ways or are conceived as 'open forms' that deliberately avoid mono-causal explanations or proof, in favour of enumeration, reversible causal relations and the accumulation of emblematic events.[18]

In this light, certain features of digital culture are not new, but return us to a previous norm, without replacing linearity or causal chains. Conventional notions of history as the most accurate accounts of what happened, how and why (or 'who did what to whom, when, where and why') are now in competition with probabilistic calculations, for which the past is primarily an accumulation of data that can be usefully analysed for recurring patterns, which in turn are winnowed in order to calculate probable outcomes. Such post-positivist theories of history thus cut both ways. While they might appear at first glance to finally take serious account of contingency in human affairs, by seeking to control or contain it, the discovery of meaningful patterns nonetheless turns unforeseen consequences retrospectively into causal agents not only in order to eliminate what might have been, in favour of what has been, but also in order to predict and pre-empt the future, which makes probability studies or risk assessment a form of reverse-engineered history. It leaves as unclaimed residue what is of interest to media archaeologists, making some of them the 'gleaners' of technological progress – but to that extent, also dependent on the data-hungry combine harvesters of the high-tech conglomerates or the security state. It highlights once more how a media archaeology of the digital is ambiguously poised between serving up the past (to data miners and aggregators) and preserving the past (for a different kind of future).

Is there a middle way, one that mitigates both the technological determinism and the ideological charge, by taking a more pragmatic approach? Looked at operationally, causation as we apply it to past events and dignify with the name of history is nothing other than an organizing principle. Therefore, it may well be dependent on models of the mind and conceptions of the world that are themselves dependent on both *the tasks at hand and the tools at hand*. If the nature of the phenomena, or the size and quantity of the material that an ordering principle is supposed to keep under control, changes dramatically,

the ordering principle itself may have to be adapted or even be replaced altogether. Thus, given that the amount of data now gathered about the world by cameras, sensors, probes, telescopes, microscopes and similar (digital) devices has risen exponentially, this poses precisely the problem of whether classical causality as an organizing principle is still adequate or appropriate. At the same time, because we can use computers as our organizing machine, we will use the computer as organizing machine – and computers, as the tools at hand, seem to be better equipped than humans to deal with contingency and random access, with correlation and pattern recognition, when faced with such masses of data and information.

But a change in organizing principle (in this instance, causality) is also a matter of the *tasks in hand*. In his account of causality in modern science, Robin McClintock argues that, up to around 1950, causal explanation dominated research: 'Researchers looked for causes in an effort to predict effects, expecting thereby to gain an 'if-then' ability to produce desired outcomes. The results were wondrous in physics, chemistry, biology, and psychology and in their application through industry, technology, and medicine' (2002). However, in the latter half of the twentieth century, scientific research focused on more complex systems with complicated dynamics: 'Here causes and effects are both bi-directional and manifold. The researcher recognizes that numerous phenomena are taking place simultaneously within an extended time and area' (2002). The problem for the researcher becomes one of modelling this complex system, not only to understand its complexity, but also in some cases to control it. McClintock lists the study of 'ecologies, climate changes, environmental pollution, weather, macroeconomics, and large-scale social change' as prominent examples. He concludes that 'The human payoff of these studies is not in the ability to produce predictable effects through a given action, but the ability to anticipate complex interactions and to exert adaptive control within them' (2002).

Consequently, a media archaeology that starts from the heterogeneous, multidimensional, and multi-directional emergence of cinema, invented simultaneously several times in different locations, such a media archaeology already reflects the likelihood that today it is easier to work with contingency than with mono-causal chains and that *modelling multiple determinations – or 'multiple variables in simultaneous interaction' – is not only more plausible and part of the* Zeitgeist*, but also faster and cheaper*. Which means that media archaeology is not by itself some more objective method or approach to either history or causality than the methods or approaches that preceded it, but already carries within itself the very principles it is supposed to investigate, thereby running the risk of producing not new knowledge per se, but reflecting the prejudices and preferences of our present age, and thus merely to introduce to this knowledge new ordering principles, i.e., those of media archaeology.

It is a point worth keeping in mind as one asks what the most urgent tasks or most important questions are that media archaeology can tackle with respect to the cinema today, and also when one hears the complaint I started off with, namely that media archaeology does not have a proper method, or has not yet identified clearly enough the problems it is meant to be an answer to. As so often in the humanities, it is the inherent reflexivity and self-reference – what we used to understand by the term 'critique' – that justifies certain procedures and approaches, not the problem-solving routines of the hard sciences. Wolfgang Ernst rightly insists: 'Media archaeology, which is concerned with techno-cultural processes, is both a self-reflexive method and an archival object of research' (2013, 41). In this perspective, media archaeology is only one among several parallel developments, where a discipline becomes reflexive in order to redefine its object of study, which in this instance includes revisionist film history, counter-factual history, memory studies and trauma theory, as well as 'the archive' as a distinct area of inquiry and study in the humanities and philosophy.

Alternative genealogies: Friedrich Kittler

So far, my main concern has been to show how the question 'why media archaeology now?' identifies it as a response – by way of discovery, amazement or shock – to the kinds of 'otherness' of early cinema, the 'newness' of digital media and the surprising entry of the moving image in the museum. Whether such ruptures are to be understood as 'otherness to ourselves' and therefore ways of recognizing and recovering more of the human in humanity, or whether this otherness is a reminder of our precarious position as a species (meaning that this very reflexivity, in the form of media archaeology, necessarily speaks from the position of the post-human) is a question that leads to Friedrich Kittler, the third thinker who inspired much of what today passes for media archaeology. Kittler's project of 'driving out the human from the humanities' (*die Austreibung des Geistes aus den Geisteswissenschaften*) would point to the latter. The phrase is introduced by Kittler himself with a passage from the *New Testament*, where Jesus is exorcising a 'legion of demons' who beg him 'to send [them] to the herd of swine, so that [they] may enter them' (Matthew 8:31). The parable, as used by Kittler, suggests a post-human vantage point, the demons of the human having to be chastised and cleansed by means of some drastically 'unclean' measures. Kittler's remedy for the humanities may thus also point to an alternative genealogy of the cinema, by introducing a radical ('quick and dirty') reductionism.

In his *Gramophone, Film, Typewriter*, Kittler (1999) addresses the question of modern media as a crisis for the human senses, brought about by the change from print dominance to the audio-visual and the shift from mechanical to electronic transmission. The three analogue media constitute for him a 'discourse network' (*Aufschreibsystem*, literally 'inscription system'), that has the exterior character of distinct technologies, but as technologies of hearing,

seeing and speaking, they are interdependent and intimately related to the human body and the senses. In Kittler's view, then, such technologies are not mere instruments with which 'man' (*Mensch*) communicates, produces meaning and 'makes sense' by 'extending his senses': rather, such media technologies determine the conditions of what passes as meaning and even decides what constitutes the human. Thus, discourse networks cannot be grounded in anthropology or in McLuhan's concept of the medium as an extension of man. Seeking to ground materially both Derrida's critique of speech and Lacan's theory of the subject as a function of one's place in language, Kittler locates the embodied sensory subject at the intersection of the historically specific communication technologies that in their discursive arrangements organize information processing – what David Wellbery calls Kittler's 'presupposition of mediality' (Wellbery 1990, xiii).

In Kittler's media analysis, it is the gramophone, not the cinematograph that provides the basis for rethinking the modern discourse network of the human. In one sense, he is right: Edison 'invented' his kinetoscope – the precursor of the Lumière cinematograph – after he had developed the phonograph, and he initially maintained that 'the kinetoscope would do for the eye what the phonograph had done for the ear', giving sound recording, also in respect of their combined function, priority over the mechanical recording of images. But what is key for Kittler is the fact that both phonograph and cinematograph record quantities of sense data of ear and eye by technological-mechanical means, i.e. with a purely technical interface, and this shifted the entire discourse network ca. 1900. 'The technological registration of the real entered into competition with the symbolic registration of the symbolic' (Kittler 1999, 230). Prior to the phono/ cinemato-graph,

> […] all data flows had to be cut up, spaced, symbolized, in order to pass through the 'gate' of the signifier: alphabet, grammatology, writing. […] As technological media, the gramophone and film store acoustical and optical data serially with superhuman precision. […] They launched a two-pronged attack on a monopoly that had not been granted to the book until the time of universal alphabetization, [from which point onwards, writing had the] monopoly on the storage of serial data. The gramophone empties out worlds by bypassing their imaginary aspect (signifieds) for their real aspects (the physiology of the voice). For the first time in human history, writing ceased to be synonymous with the serial storage of data. (Kittler 1999, 246)

The concept of 'serial storage of data' aligns the technologies of sound, image and writing with digital data and thus establishes the computer as the technology that both completes and supersedes previous storage media:

> Sound and image, voice and text are reduced to surface effects, known to consumers as interfaces. Sense and the senses turn into eyewash. Their media-produced glamour will survive for an interim period as a by-product of strategic programs. Inside the computers themselves everything becomes a number: quantities without image, sound, or voice. With numbers, everything goes. Modulation,

transformation, synchronization; delay, storage, transposition; scrambling, scanning, mapping. (Kittler 1999, 1–2)

In this way, Kittler's emphasis on the recording (the trace), the storage (memory) and the transmission (access) of sensory data privileges the phonograph and cinematograph (as well as the typewriter, the technology of alphabetization) over photography.[19] From a media archaeological perspective, this is a shrewd tactical move, because it avoids some of the apparent problems when thinking the cinema, since the individually framed image with celluloid as its material support, i.e. the photographic ontology, stand in the way of adequately understanding the cinema in and for the twenty-first century. For Kittler, photography does indeed belong more to the history of art than media-theory; similarly, the cinematograph is important less for its iconicity, mimetic properties or indexicality of place, site and space, but rather because of its indexicality of time: both gramophone and film were revolutionary media by their capacity of storing time (what we now call 'real time'). The crucial point, however, is that the storage of time as the direct, unimpeded, automated data flow is not only inimical to art, but also inimical to sense: *the cinema is historically significant for Kittler in that in essence, it is 'meaningless': not non-sense, but n-sense* (n- here standing for 'noise', 'neural' and the n-th degree: the 'too much' of sense and for the senses, i.e. the stimulus overload which the technical media challenge and tax the human sensorium). *Mise-en-scène*, montage, compositional aesthetics etc., would not be part of the cinema's inherent nature, but a secondary response – a hysterical symptom or merely a disciplinary reflex – to the cinema's automatism, now understood as another name for the Lacanian Real.[20] Rather than extracting sense from sensory data, a film's narrative, genre, style etc., would constitute ways of imposing sense on n-sense, but always ultimately failing to quite tame the kinetic presence of the technological Real, or to altogether mute what Heidegger would call *das Grundrauschen der Existenz*, the all-encompassing white noise of sheer existence, as captured by the technological apparatus.

Regarding the cinema's automatism, it will be recalled that film theory has almost since its beginnings, struggled with this aspect of technological reproduction in the medium. For many film theorists and writers in the 1920s, it disqualified the cinema as 'art', while for a later generation – starting with André Bazin (and following him, taken up by philosophers such as Stanley Cavell, Gilles Deleuze and more recently, Rancière, Jean Luc Nancy and Alain Badiou) – the fact that the cinema could capture, record and store the world without the intervention of the human mind, the human hand or the human obsession with finding and making meaning, was precisely what rendered it so unique and precious. Yet, this very same automatism reminds us of the incontrovertibly technological condition for the cinema to be not just an apparatus for image-making among other such machines, but also a form of thought, *sine ira et studio*, i.e. both *disinterested* and *indifferent*, and thereby turns every

philosophy of cinema, which highlights this automatism, always already into a form of media archaeology.

Yet, Kittler assertions can be taken further: for him the technical media and their automatic generation of sensory (sonorous and optical) data puts all symbolic systems – including film philosophy and presumably media archaeology – into crisis. However, there is an interesting obverse to this, namely that the cinema has helped this automatism of thought to prestige and prominence (a feature extensively explored in Gilles Deleuze's cinema books). On the other hand, free association and the talking cure (Sigmund Freud's psychoanalysis) along with automatic writing (André Breton's surrealist techniques) could then be understood as the mimetic responses or rear-guard actions to the uncanny automatism of the cinematograph. However, for Kittler, such automatisms of perception, cognition and action are now better served by algorithms and electronic circuits than they are by celluloid or vinyl. It would make the cinema – along with psychoanalysis – a transitional phenomenon, a historically vital and valuable, but finally expendable help maiden, on the way to some other technology that can automate cognitive processes and the calculation of consequences: the computer.

Two kinds of media archaeology

Reading Kittler (against Kittler) for a media archaeology of cinema (for him mere 'eyewash' – a temporary interface between data and the human senses), is a sharp reminder that there is, perhaps, an insurmountable split between a film history conducted as media archaeology, such as I have been trying to explore in the preceding chapters, and a media archaeology that is firmly dedicated to tracking the *arche* of the digital.[21] The cinema's archaeo-logic demands that we materially ground 'projection', the 'screen', the 'camera-eye' in technologies that refer us to the machine age, and as I argued in 'Cinema, Energy, Entropy' (reprinted in *Film History as Media Archaeology – Tracking Digital Cinema*), that have to with the transmission and conversion of energy. For instance, Wim Wenders has Bruno, the projectionist in *Kings of the Road*, explain that the inconspicuous Maltese cross is a key device in its relation not just to the impression of movement, by creating space and interval, but as part of an energy transfer mechanism that turns circular movement into linearity through alternation and interruption.[22] It also aligns the cinema projector with the lever escapement mechanism of pocket watches. By contrast, the particular techno-logic of the digital takes us into the realm of electromagnetism. In writers like Kittler and Ernst, this logic is made up of switches and relays, of circuits and grids, and is made possible by harnessing electricity and mastering electromagnetic fields, rather than by mechanical devices arranged in a particular spatio-temporal order, what Stephen Heath calls the 'very geometry of [cinematic] representation' (1976).[23] Whereas the cinema comes to life with

the cut and montage, or the long take and deep space, the digital is animated and brought to life by a combination of mathematics, logic and linguistics. The consequence of this split or rift in media archaeology is that from the perspective of the electronic image, as we saw, the cinema has become obsolete, as obsolete as the mechanical watch has been made by digital time pieces, yet surviving as ornament and luxury accessory.

Might it be possible if not to heal this rift, to nonetheless come to a better understanding of why and how it occurred? The stakes are significant: it would, on the one hand, help answer my question what is/was the cinema (good) for, and on the other, clarify how the cinema might become, either despite, or because of its supposed obsolescence, the repository for that different kind of future that seems to lie at the heart of media archaeology's utopian aspirations. In several of the preceding essays, the digital turn of cinema was treated as a rupture, but not primarily in terms of technology or by juxtaposing the analogue to the digital. Instead, it served as (yet another) reflexive turn in thinking about the cinema, in a move that displaces and estranges what we think we know, so that – thanks to early cinema *and* digital media – we can re-situate the cinema's emergence and persistence (along with the impression of obsolescence and marginality) within the wider field of human endeavour. Rather than forcing the divide between analogue and digital, between the indexical and the (merely) iconic, the success (and succession) of the digital image in emulating, enhancing and appropriating the photographic image as one of its interfaces and 'special effects', can be the welcome occasion to rethink the history and purpose of images more generally. One might then ask: is it possible to locate more precisely the common *arche* as well as the parting of ways between the mechanically generated and the electronically produced moving image? It would give substance to the claim that – in media archaeological terms – we can retroactively identify the cinema as belonging to several alternative imaginaries and that it is part of several parallel histories. For such a possibility we are becoming more receptive than we used to be, precisely because we encounter the cinema today in so many different manifestations, modalities and media: with the result that the discussion around digital cinema has opened up our awareness of the past in new ways, and this in turn has generated new impulses and fresh energies for thinking the cinema's future.

Traditionally, film historians, when discussing the genealogies or pre-histories of the devices, practices and technologies that have made possible the 'invention' of cinema, focus on four strands: the ancient arts of projection (camera obscura), the history of photography (light-sensitive substances), the modern developments in optics (telescope, magnifying glasses), and the peculiarities of human perception when visualizing movement ('persistence of vision'). Film theories (of the 'cinematic apparatus') add to these the dominance since the fifteenth and sixteenth century of monocular perspectival

representation in Western art, adopted by the cinema when constraining the projected image within a rectangular frame.

Concentrating on just some of these factors – the *camera obscura*, modern optics and Renaissance perspective– one can draw up a chart of names and dates, of devices and discoveries that seem to lead, quite naturally and even inexorably, to the invention of cinema. While perspective projection depended on the *camera obscura*, modern optics, as the science of light was re-thought and consolidated from various Greek and Arab sources by three generations of mathematicians-astronomers-philosophers.[24] Some such chronological sequence of names and events tends to make up the conventional narrative, with brilliant men passing on their discoveries to each other. In the process, they consolidate diverse observations and theories, refine practical gadgets and perfect scientific tools, until the various strands converge, to produce serviceable prototypes or recognizable antecedents of what we are ultimately interested in, namely the projector and the *cinématographe*, a combination of the magic lantern and photographic camera.

The 'archaeological' approach proceeds differently, presuming neither inevitability nor convergence. Instead, it emphasizes the *heterogeneity* of the cinematic apparatus, as hinted at by the discontinuous and improbably surreal assemblage of magic lantern, and photographic camera, driven by mechanisms borrowed from the machine gun and the sewing machine, using strips of cellulose, first developed for gunpowder, as well as a potentially lethal cocktail of assorted chemicals.

What an archaeology might also highlight are a number of tensions and contradictions embedded in the cinema as we know it, along with the complex genealogies of sound, which a shift in attention resituates or even resolves, but now within an enlarged context or extended time frame. One such inherent tension, for instance, is the very set-up of the cinematic apparatus, and stems from the fact that the light emanating from the movie projector or beamer extends and scatters over a wide area: it fills the given space in varying degrees of density and intensity, not unlike sound which also 'fills a space'. However, in order to achieve an 'image' this light has to be re-absorbed by a black surround and a rectangular frame, thus countering the scatter-effect by bundling the light and redirecting it towards the carefully delimited part of the overall space that is the screen. Without such a frame, off-screen space would not be possible and the entire theory of suture would not have the hold that does or did have on certain film theories. More generally, with screens today often so large that the image actually or potentially exceeds the human field of vision, this constraint inherent in the traditional cinema screen loses its normative status and becomes more noticeable as a historical convention hiding a contradiction.

Furthermore, such unbounded images, projected – thanks to the technology first developed for anti-aircraft search lights – on any surface whatsoever, open up the possibility of retroactively returning to a long-standing practice among

the arts of projection that appeared to have become obsolete with the arrival of the cinema, namely the phantasmagorias of the late eighteenth and nineteenth century of, among others, Paul Philidor and Etienne-Gaspard Robertson.[25] This practice, once so prevalent and popular – and a highly significant metaphor for a philosopher such as G.W. Hegel – has been known to film historians, and is regularly mentioned in passing. However, it has only achieved the status of a 'neglected' tradition worth revisiting since our own visual environment once more resembles phantasmagoria spectacles.[26]

Mobility, portability, commodity

However, another tension that is also not unknown, but often ignored is how the cinema inscribes itself in the long history of making images mobile and portable, which takes us back to Renaissance Italy, the secularization of image making and the establishment of a market for pictures, in the way that other goods are manufactured on demand and marketed. The move from fresco walls to oil painting is a complex one, with far-reaching consequences, which among other things proves that such transitions and transformations are neither linear nor gradual. One simple point to make is that a mobile picture can become a commodity, be bought and sold, traded and transported, owned and displayed in ways and places quite different from a mural commissioned by a monastery or a church. This process of mobility and portability affected both size and subject matter, but it also determined the mode of representation and made special sense of monocular perspective, reinforcing the spectator's single point of view, as if to 'anchor' the image via the sight-lines, as if to compensate for the picture's sudden mobility and variability in physical space.

Photography is, of course, the medium that has most decisively intensified these 'economic' aspects of image making and image trading, and accelerated the mobility of images, as well as the 'trading places' between mechanical images and mass produced objects in the form of commodities. The interesting question – which I raised in the introduction – why did the moving image rely so heavily on photography, when electronic image making and image transfer was already so close technologically and so speculatively fantasized, might here find an answer of sort. The cinema, as a photographic medium, was able to inherit and to exploit both traditions – that of wall paintings or murals, and that of miniature and oil-printing, combining the advantages of size and extension provided by an image-wall with the framed and centred view of the oil painting, as well as the attention to detail and close-up inherent first in the miniature, and later in the photograph.

Yet, while getting the best of all possible image worlds, the cinema also embedded another tension in its *dispositif*, so that the different parameters of fixed and mobile, of the focused gaze and the wandering eye had to be renegotiated and played off against each other. It required the moving image to leave

the cinema theatre and make its way into the gallery space, for us to become once more acutely aware of these parameters, so that a video and installation artist like Bill Viola can, as it were, rediscover for his films the Christological drama of the triptych altar piece of the Gothic cathedral and reinvent the interior of Giotto's Scrovegni chapel in Padua for his *Going forth by Day* (2002) at the Guggenheim Museum in New York. By a paradox that perhaps only the media archaeologist can fully appreciate, contemporary art has rediscovered the unique aesthetic value of location and site-specificity, which artists sacrificed at the point in time when images became secular, and the need to create a market required mobility: patrons and site specificity versus market and mobility would appear to constitute trans-historical variables, when it comes to the status of images.

The increased-mobility-and-circulation argument about images since the 'invention' of easel painting, and thus their closer alignment with commodities which can be traded, owned and possessed, is also a thesis advanced by Fredric Jameson in his essay 'The Existence of Italy' (1992), and similar reflections can be found in John Berger's *Ways of Seeing* (1972) (see also Buckland 1997). What this means for a genealogy of the cinema is that the circulation and mobility of images in the form of framed pictures turns them into physical objects, while the material objects depicted become immaterial representations – a move often commented on in connection with Dutch still-life paintings (the 'pronk' pictures of the 1660s–1690s), where food and precious objects are arranged and displayed in ways that shop windows were to exhibit luxury goods in the grand department stores on the boulevards of Paris or on New York's Park Avenue. Across a two-hundred-year gap, then, the cinema around 1900 would be taking up this Dutch art of transubstantiation, 'remediating' it from painting, photography and the shop-window display, to film, tableau and the moving image.[27] Indeed, cinema would thus not only be a storytelling *medium*, but function also as a *mediator* that prepares and reshapes the physical world as image, picture and spectacle, in a process that only intensified and accelerated throughout the twentieth century, leading a political film-maker like Farocki (2004) to concede that even his kind of critical cinema inevitably contributed to 'making the world superfluous' as images absorb the real in the very act of representing the real.

It is no secret that Hollywood movies are (among many other things) the site, the engine and emblem for franchising, brand advertising and continually repackaging The American Dream, but the admission of making the world superfluous also targets documentarists, and any film-maker who forces the real world (and real people) to compete with (their screen) images. The two essays on the 'Rube' in the present collection speak to the issue of object-hood and commodity, each with a different focus, but both concerned with the relation of sight to touch, of eye to hand, of gazing to grasping, as well as with the

fascination and fetish-function that the cinema inaugurates and colludes with, as it intervenes in the world and interacts with the spectator.[28]

Geometrical optics and physiological optics

Important in the 'from … to' linear narrative I have just sketched – from fresco wall and mural to oil painting, from easel painting in the studio to the easel *al fresco* in the landscape, from portable easel to portable photographic camera, and from portable photographic camera to the Lumières' cinematograph – is to note the mobility *of the image* and the automation of its registration, but also what resists this progression. Obstinately holding mobility in check, containing, focusing and fixing it *within the image* is the single point of view, itself subjected and directed by the rules of monocular representation, but also, one could argue, specifically introduced to act as a counterpoint. Insofar as we associate the cinema with this Renaissance model of perception and argue that this single point of view reinforces both bourgeois individualism and a strict subject–object division, we may want to hold on to the notion that the cinema based on an unresolved contradiction. Is it going to be resolved, now that our contemporary media landscape (of multiple screens, both big and small, both indoors and out in the open) and our contemporary media use (watching movies on our smart-phones, using YouTube and Vimeo or Hulu and Netflix as our video store) encourage us, indeed oblige us to adopt multiple points of entry and access (if not points of view), to be multi-tasking and to be flexible both in our object-relations and our subjectivities?[29] To be held in thrall by the double geometry of linear narrative and monocular perspective is now experienced more palpably as the arbitrary constraint it has always been, merely by the fact that other modes of interacting with moving images have become so readily available, and have found so little resistance in becoming habitual and commonplace.[30]

Yet, this is not the only conclusion one can reach. There are ways of thinking about the cinema, outside the constraints of the cinematic apparatus, and past the apparent blockage that the ontology of photography has created for post-photographic cinema. Philosophically, it has been the revival of phenomenology on a broad front, which is symptomatic of the blockage, as it attempts to address the limits of the fixed geometry of representation. Yet media archaeology, too, should be able to rise to the challenge and offer an alternative genealogy, which grounds the cinema differently, and shows how there are genealogies that can help us formulate such an alternative.

For instance, in what might seem to be a counter-intuitive and even counter-factual move, one can enlist Bazin – champion of cinematic automatism, proponent of the ontology of the photographic image, and counted among the phenomenologists of the cinema – as also an eminent media archaeologist of a cinema, for whom photography is only one possible physical and metaphysical

support.[31] As recent scholarship has shown, there are many more Bazins, and one of them has always proposed plausible arguments for regarding the cinema as part of a very long history of human preoccupation with mortality and death, under the dual heading of preservation and afterlife. The cinema for Bazin belongs to the same spiritual urge, fed by anxiety and dread, out of which humans have wanted to preserve the dead, by mummifying them. Reminding his readers, among other instances, also of the Turin shroud, Bazin insisted on the cinema's role as trace and index, in the way that plaster casts and death masks preceded photography and at the same time were continued by photography, even to the point of eventually using the same negative–positive reversal in order to preserve the uncanny likeness of human beings after death, fixing their faces and expressions as if they were alive. The cinema – defined in this way – is both very ancient and very modern, and therefore, as long as human beings fear death and wish for an afterlife that is both immanent and tangible, the cinema will persist and survive. Bazin's film history as media archaeology, in other words, makes room for a genealogy that embeds the cinema in a history of opacity rather than transparency, of material objects like an envelope or a cast, rather than identifying it solely with a view to be contemplated and as a window on the world.

In Bazin, these alternatives do not preclude each other, but exists side by side. Similarly, I believe it should be possible to develop a media-archaeological account, from which analogue cinema and digital cinema, can be seen to be equally valid if differently weighted ways of understanding both the material basis of cinema and its different manifestations over time, so that apparent 'returns' – such as the 'return' to site specificity, the 'return' of 3-D, or the 'return' of phantasmagoria as installation, and of the diorama as triptychs of multiple plasma screens – need not be plotted on a chronological timeline and therefore need not be seen as returns at all, but instead, appear as ever-present resources that film-makers and artists are able to deploy as options and possibilities. Once again, however, media archaeology appears in its ambivalent role as symptom: on the one hand, it suggests a freeing up of historical inevitability in favour of a database logic, and on the other hand, it turns the past into a self-service counter for all manner of appropriations.

Can film history benefit from media archaeology opening up parallel trajectories that do not split analogue from digital, but assign epistemological stringency also to today's seemingly hybrid cinema? We might start with the nature of light itself, its propagation through space, its absorption by physical bodies, and its perception by a sentient subject. The discussion might take us to the Dutch Republic around 1650, when a young Christiaan Huygens, brilliant mathematician and indefatigable experimenter, was writing a study of probability calculus, which already in 1657 challenged linearity as causal organizational principle.[32] Acquainted with professional lens grinders such as Baruch Spinoza and Antoni van Leeuwenhoek, both of whom made significant

advances in constructing better microscopes and telescopes, Huygens in 1659 sketched the first drawings of a working magic lantern. Interested throughout his life in the science of light and projection, he devoted a considerable amount of his research to elaborating what was then a minority view, namely the 'wave' theory of light.[33]

Huygens discussed optics also with Isaac Newton, and knew about the controversy between Newton and Robert Hooke over the properties of light (wave or particle). Given Newton's towering reputation, it was assumed that Newton was right (i.e. light is made up of particles that travel in straight lines), and for many practical purposes (including the projection of a transparent slide) the particle theory of light seemed both confirmed and adequate. Yet, as we know, the nature of light never became an either/or, open-and-shut case, and today the particle-or-wave argument is one – albeit simplified –way of distinguishing between two kinds of optics: a geometrical optics and a physical or physiological optics. It is geometrical optics (where light travels in rays along straight lines, and may be absorbed, reflected and penetrate transparent surfaces) which by and large underpins our traditional genealogy of the cinema, implying that from the magic lantern, as developed by Athanasius Kircher, a direct and uninterrupted evolutionary line leads to the cinematograph and thus to the cinematic apparatus, i.e. what I have referred to as the fixed geometry of representation. As someone who brought together in his thinking innovative (and alternative) theories of light and interference with even more avant-garde theories of contingency and probability, Huygens would seem to deserve a recognizable place in today's media archaeology of both cinema and the digital media.

The first in modern times to challenge geometrical optics from a Foucault-inspired perspective was Jonathan Crary in *Techniques of the Observer* (1990), a media archaeological account in all but name, by an art historian, documenting the diversity and heterogeneity of visual culture in the nineteenth century. In a perceptive review, Tom Gunning highlights the book's significance for film theory and film history:

> Crary's originality lies in interrelating [the romantic valuation of the subjective and the embodied] to the nineteenth century's technical investigation of the physiology of perception. The model for perception no longer parallels the rational and disembodied vision of the camera obscura but rather founds itself on an actual examination and, in Foucault's sense, discipline of the physical organs of the senses. (1992, 52)

Crary, however, not only compares scientist's account of perception with artists' experiments with different ways of seeing. It is pre-cinematic devices such as the phenakistoscope, or the hand-held stereoscope – popular pastimes that were once found in almost every bourgeois home – that hold the key to the changed physiological optics. As Gunning notes:

> The 'philosophical toys,' devices that produced optical illusions of motion or three-dimensionality, resulted directly from these physiological investigations,

usually as demonstrations of recently discovered properties of vision. In contrast to the camera obscura, such devices claimed no access to a stable reality. Rather, the realism they produced fascinated observers precisely through its illusory power, recreating a realistic simulacrum independent of an actual referent. The physiology of the eye, the body of the observer herself, produced the superimposed images of the thaumascope, the apparent motion of the phenakistoscope, or the three-dimensional illusion of the stereoscope. Instead of an image of the tangible exterior world created by the reassuring illumination of sunlight, these visual devices cast light on the dark processes of the body, the ability of perception to be manipulated divorced from an actual referential reality. […] Crary's thesis breathtakingly ruptures the myth that three-dimensional illusionism [of Renaissance perspective] has a constant ahistorical significance. (1992, 52)

Crary's rehabilitation of physiological optics as having existed throughout the nineteenth century alongside geometrical optics (with the most popular optical toys and vision machines being based on physiological optics) would constitute a first step also in understanding how and why, in contemporary cinema (and film studies), there is a strong tendency to think of spectatorship once more in terms of embodied perception (i.e. immersivity, interactivity, tactility). However, while most film theorists proposing such a 'turn' to embodiment, support their case either with the 'return' of phenomenology (Merleau Ponty) or by applying theories developed in the cognitive sciences (Antonio Damasio's writings about the 'embodied mind', for instance), the media archaeological argument would derive such a notion of embodiment both from the contrasting, complementary and still debated theories of optics, which first divided the minds in the late seventeenth and early eighteenth century, precisely when the magic lantern became a popular source of entertainment, and from the evidence adduced by Crary, that embodied perception in the form of physiological optics was the default value of much of nineteenth-century visual culture. Giving equal weight to physical optics, alongside geometrical optics in a media archaeology that seeks to excavate alternative genealogies of cinema would therefore be in line with the argument that contemporary cinema is best understood in terms of embodiment – even without invoking digitization or the digital media as the main determinant.

In other words, once monocular perspective – the prime symbolic form that gave geometric optics its normative status – is no longer the default value of our ways of seeing and our modes of representation, one begins to discover ample evidence which suggests that in the history of visual media, there have been vision machines, optical toys and para-cinematic devices that are either explicitly based on, or implicitly acknowledge physiological optics, as opposed to geometrical optics. Extending Crary's argument, one could say that a physiological optics rather than geometric optics as starting point makes room also for considering the cinema more in terms of energy and intensity, with images regarded as emanations and presences, rather than as iconic likenesses or 'representations'. This, I have done in several of the preceding essays, albeit on the

theoretical basis more of Whitehead and Benjamin than Hooke or Huygens. Likewise, a wave theory of light also brings the image into closer proximity with sound, with sonic spaces and sound-design, long recognized as one of the key changes that has transformed mainstream cinema since the mid-1970s and continues to shape today's film experience, as discussed in 'The "Return" of 3-D'. Retroactively, Walter Ruttmann's theory of the 'optical wave' (as discussed in the chapter on Ruttmann in *Film History as Media Archaeology – Tracing Digital Cinema*), also fits into this line of thought, underscoring his importance for a media-archaeology of the cinema that pays appropriate attention to sound. (See also Cowan 2014.)

A name that comes up in Crary, as well as in my discussion of energy and entropy, is that of Hermann von Helmholtz, who – in this conjuncture – might well emerge as a key figure, in whose work the different media-archaeological accounts of the cinema intersect. Helmholtz is the author of the foundational treatise of physiological optics, the *Handbuch der physiologischen Optik* (1867) as well as a study of the physiological basis of music, *Die Lehre von den Tonempfindungen als physiologische Grundlage für die Theorie der Musik* (1863). Helmholtz was also a crucial figure, along with Maxwell-Clark, Faraday and Hertz, in analysing electromagnetic fields, and thus, in laying not only some of the groundwork that harnessed electricity for the generation of energy as both labour and light, but also for electronics – another way of controlling electricity, in the form of circuits, switches and relays – as the basis of signal and information processing, as well as radio- and telecommunication. Given the dependence of the digital image on precisely these functions and properties of electricity, it may offer the opportunity to align the complementary fields of physiological optics with those electromagnetic theories of circuits and relays, where waves, interference, diffusion and diffraction, as well as energies, perturbations and intensities play a significant role. Almost all of the physics that has made possible the Internet, Wi-Fi and satellite transmission relies on sophisticated versions of the wave theory of light and on electromagnetism. It therefore makes sense to think of the moving image as sharing some of these properties as well: not only reaching the retina and stimulating the ocular nerves, but also affecting the other senses, impacting and enveloping the body, now considered as a total perceptual surface, and receptive to the energy fields that surround it and into which it is immersed.

For instance, blockbuster films at the multiplex increasingly depart from the framed view, affording the spectator neither a fixed horizon nor images at the human scale: think of *Avatar, Life of Pi, Gravity* or *Interstellar*: deep space, the earth's oceans or other planets seem merely the narrative pretext for altering our spatial coordinates in order to re-calibrate perception by disorienting vision. At the micro-level, a similar tendency operates in inverse: the image comes too close, both visually and viscerally, for the viewer to gauge scale or to keep her distance: 'goPro aesthetics', i.e. small cameras as used in certain documentary

films (I am thinking of the Canadian film *Leviathan*, immersing us in deep sea fishing), frequently reinforce and exploit these possibilities, inherent in the digital image, of conveying tactile sensations and haptic qualities, and thereby make the image appeal to the sensorial register of touch and the sensitivity of skin.

As examples of physiological optics, such films not only render images more tactile, but also fill the space and are absorbed by our senses through their highly elaborate spatial sound design. Through this surround sound, we receive sensory information not only from all directions but also to different parts of our body – the ear, of course, but also the skin and the solar plexus, which means that the main organ of perception is no longer the centred eye of Renaissance perspective with everything aligning along the visual cone, but a different kind of scanning of the optical as well as the sensory field, leading to an involvement of the body. It is in this sense that the whole body becomes a perceptual surface – eyes, ears, skin, belly, fingers. Realignments of the (embodied) mind and (perspectival) space might well be one of the indications that, with regard to vision, a different episteme is about to establish itself right across culture, from avant-garde film to installation art to mainstream cinema.

Media archaeology as the ideology of the digital?

One of my main arguments for media archaeology not only as the most appropriate contemporary form of historical research, in that it is of its time and for its time, but more specifically the argument for a *film history as media archaeology* would be that since the beginning of the twenty-first century, our visual culture has undergone several kinds of change. And while on the surface it seems to be connected to, and even 'caused' by the digital turn, the closer look and a wider horizon, i.e. a media archaeological perspective, suggests that this 'turn' is also a 'return' to an earlier engagement with images, except that 'return' implies a linear sequence, which media-archaeology explicitly sets out to 'upturn' and to distribute spatially rather than chronologically.

Does this help us answer the initial question: what is or was the cinema (good) for? I tried to make an argument that, for much of its history, the cinema has not only served as the prime storytelling medium of the twentieth century, but also greatly accelerated the mobility and circulation of images as pictures of the world, and thereby aided the commodity status of objects as images and images as objects. These (ideological) functions, however, have now largely been taken over by different media configurations (television, the Internet) and the respective institutions and corporate entities that control and own them. It thereby 'frees' the cinema for other purposes and functions, so that its 'obsolescence' may be the more overdetermined, but also the most appropriate name for this 'freedom' – not from practical use, but from ideological servitude. Yet this freedom, which I have epitomized as a 'poetics of obsolescence' may also have a hidden underside, as it were, which can take several forms:

First, media archaeology, despite the brave calls for going against the grain, for making a last stand against the tyranny of the new, for digging into the past, in order to discover there an as yet unrealized future, nonetheless does not escape our culture's most prominent pathology: the need to preserve the past, to fetishize 'memory' and 'materiality' in the form of trauma and loss, even as we lose faith in history and make our lives evermore dependent on the 'virtual'.

Second, media archaeology has carved out a disciplinary niche for itself in media studies and the field of new media of the 1990s, because it offered a historical perspective that countered the claimed memory-loss of digital media and what Wendy Chun calls 'the enduring ephemerality' of Internet culture. In this sense, the insistence on the relevance of the old and obsolete may well be the necessary double of the celebration of the new we have been living. After all, obsolescence is a term that belongs to the discourse not only of capitalism and technology, but speaks from the position of relentless innovation and 'creative destruction': which cannot but include media archaeology as part of the ideology of digital media.

Thirdly, media archaeology, especially in the realm of media art, has been instrumental in promoting the notion that *everything, which used to be non-art can become art.* This is not altogether new, because it is the axiom at the heart of conceptual art and pop art from Marcel Duchamp to Andy Warhol. Yet it, too risks being merely the flip-side of the general appropriation of the past for the benefit of our corporate future, and thus merely the lure or bait that the beauty of the no-longer-useful holds out, instead of being the resisting reminder of unfulfilled potential and the reservoir of utopian promise, which is how Benjamin regarded the *objet trouvé* in his essays on Surrealism and photography.[34]

The consequence is that a media archaeology considering itself cutting-edge in the contemporary art world, is not only a proxy avant-garde, but allows every past scientific experiment, or pseudo-scientific practice, every failed media device, every obsolete technology, every disproven theory, and every mad hatter's invention to be revived as 'art' or recycled as 'vintage' and 'classic'. Museums and art spaces are reverting to the curiosity cabinets from which they emerged in the nineteenth century, repeating the imperial and colonizing gesture of the collector of captured exotica, except that the wonders of nature and the noble savages of bygone times are now the remnants of the industrial revolution, of the first machine age, of consumer culture – which includes the cinema, as that age's 'last machine' (Hollis Frampton). *Might it be that 'culture' and 'art' are in the process of usurping industry and technology, rather than the other way round (as T.W. Adorno and others had predicted and feared)?* In the face of an electronic present that exceeds us at every turn and eludes our grasp, media archaeology in art spaces becomes symptomatic of the material fetishes we require, in order to reassure ourselves of *our* material existence, or rather:

in the mirror of these media machines' sculptural objecthood we can mourn and celebrate our own ephemerality *and* obsolescence.

Making a fetish of obsolescence would thus be part of media archaeology's ideological function, by giving digital media not only a pedigree, but also a 'soul', allowing the nostalgic appropriation of anything that preceded it. The digital is such a powerful lure, not merely because it thinks it *owns* the future, and can accommodate *every* past, and not merely because it puts an end to the humanities and enlightenment humanism, itself endlessly critiqued and deconstructed since Nietzsche and Heidegger. The digital is such a lure because it promises to put an end to the human as we know it, which is to say, an end also to the human condition – including our individual finitude.

Who can tell the promise from the threat? Even a media archaeology that recognizes itself as yet one more symptom of how our current way of life is unsustainable, both morally and ecologically, or thinks of itself serving as the emergency break on the express train that is travelling on a bridge to nowhere, does not escape the risk of merely being the whistle that blows off steam. On the other hand, a media archaeology that promotes itself as a materialist episte-mology of knowledge reflects the awareness that all knowledge (of self and the world) is henceforth (or as Kittler would say, has always been) technologically mediated. Therefore, the epistemological bases of how we know what we know, of what is evidence and what is presence, of what is material and what is embod-ied, of what is dead and what alive – all these (ultimately 'ontological') questions must be put to the media technologies that surround us. Their study cannot be reduced to the engineering blueprint of their mechanisms, nor is their meaning to be sought solely in their use, since so much of what makes us human would seem to be baked into them, if we follow Benjamin, Foucault or Kittler. It gives media archaeology – as the determinate 'reading' of these technologies, in the spirit of recovering the fantasies sedimented in their functions, and reviving the aspirations embedded in their design – the status of an allegorical device, by which the human and the machine interpret, but also interpenetrate, each other. The more 'life' becomes 'designed' (while reality becomes 'virtual' and 'intelligence' becomes 'artificial'), the more 'art' has to include 'non-art' and be 'life-like': glitchy, object-oriented and un-intended (or: failure prone, thingy, random and contingent). Such 'allegorical' archaeology epitomizes the two-way street between humans and machines, encapsulating their mutual compatibility.

What my brief example of geometrical optics and physiological optics as being two sides of the phenomenon of light, with both optics feeding into what we know as 'cinema', wanted to show was how a binary divide might be overcome by enlarging the context, as it were, and extending the horizon. It does not dissipate the fundamental ambivalence of media archaeology, but gives this ambivalence its place as placeholder (of the human). As the discourse that shadows the digital (indeed as the discourse secreted by the digital), but also resists the digital, media archaeology is the symptom of the disease of which it

also hopes to be the cure: deconstructing and reconstructing the human *after* the digital and *through* the technological.

It is in the interstices of such a media-archaeology that our view of the cinema of the twenty-first century is taking shape. Having handed over its primarily ideological functions to television and the Internet, cinema is ever more part of life, which is to say, ever more omnipresent, filling not only each available screen, but every accessible space: becoming invisible, as it were, by virtue of its ubiquity. In this respect, Hollywood event-movies are in full alignment with the digital culture in which they thrive and with the futures this culture presumes to own.[35] We seem to have come full circle: digital cinema revives and reinstates nineteenth century physiological optics, 'harking back to' phantasmagoria spectacles, to panoramas and dioramas, bridging the divide between interior and exterior, and creating perceptions that augment or add reality to the world, rather than represent or reflect the tangible realities of the world. Sidelined, though not suppressed are geometrical optics, which – ever since Descartes and Locke defined 'man' by a strict subject-object divide – indexed the camera obscura as the most appropriate metaphor for the rational mind. Emulated by the cinematograph, the optics of the camera obscura led the cinema (with the exception of the brief period of early cinema, when a film like *The Big Swallow* could swallow up not just the cameraman, but the entire episteme of geometrical optics) towards the disembodied eye and the mobile view, useful ideological tools, as we saw, for both dominance and discipline. If the cinema's digital reincarnation seems to 'undo' all this by once more giving the spectator both body *and* sight, and the image both volume *and* site, it is helpful to remind oneself that we are dealing not with antagonistic or incompatible systems, but with the dual manifestations of light itself, complemented by the (aural and visual) genealogies of imprint and trace, of index and signal.

On the other hand, the cinema's purported obsolescence, initially debated around the nature of indexicality, photographic and post-photographic, but now put in the wider context of instantaneity, interactivity and simultaneity, by a media archaeology focused on television and the electronic media, also means that the cinema's freedom from ideological tasks – its indifference, its inoperativeness, its uselessness – can also be assigned a different value. This value dovetails with the moving image's increasing importance for museums and galleries, given that one of the traditional conditions of an object or a practice for entering the art space is its 'autonomy' and thus its freedom from practical uses and its independence from instrumentalization: the post-photographic obsolescence of a certain (idea of) cinema would thus converge with a newly acquired status as 'art', at least within the definitions of art as conventionally formulated.

Film history as media archaeology can thus be understood as also a way of readying the cinema for this special kind of inoperativeness, the one we associate with art. In other words, film theorists do not have to claim for the cinema

the status of art a priori, as they have so often done since the 1920s, with the consequence that – as the study of early cinema has shown – in pursuit of this ideological project, vital aspects of the cinema's history and pre-history were suppressed, ignored and even distorted. Instead, the cinema in the twenty-first century has *become art*: now in Walter Benjamin's sense of something taken out of circulation, thereby preserving, accumulating or setting free energies inherent in the useless and in the free play of the disinterested. Such a dimension of art would have emerged out of the medium's material histories, treated as allegorical archaeology, rather than floating above history in the timeless realm of the beautiful and the true. Here, too, a circle seems to complete itself: Media archaeology, initially indifferent or even opposed to the question of whether the cinema was an art form, turns out – under the conditions of a digital culture, to which it partly owes its existence – to provide the arguments for the cinema to assume the historical as well as theoretical status of art, assuring it of a future thanks to its being an intermezzo, a detour and obsolete. Does this answer my question 'what is the cinema (good) for'? Probably not in any exhaustive way, and possibly not even to anyone's satisfaction: but hopefully it supplies enough 'conceptual friction', enough 'reading against the grain' and 'food for thought' to put the question on the agenda.

Notes

1. See the overview essay by Wanda Strauven (2013), but there are several searching book reviews of Erkki Huhtamo and Jussi Parikka's *Media Archaeology* (2011), while the journals *Equinox: Journal of Contemporary Archaeology*, 2 (1) (2015), on Media Archaeologies, and *View: Journal of European Television History and Culture,* 4 (7) (2015), on Archaeologies of Tele-Visions and -Realities, have published special issues.
2. Reviewing Zielinski's *Deep Time of the Media* (2006) and Huhtamo/Parikka's *Media Archaeology* (2011), Simone Natale comes to the conclusion that there 'is a substantial methodological anarchy, which is often characteristic of the work of media archaeologists. [… Huhtamo and Parikka] confirm the impression that media archaeology should be regarded as quite a heterogeneous set of instruments and inspirations to be used by historians of media, rather than as a coherent theory about the development and history of media technologies. […] However, this choice also brings some risks: by merging media archaeology with a wide range of perspectives in contemporary media history, one ultimately risks losing the significance of this approach – as when you dilute a small amount of salt in a much too large pot of water.' Natale (2012), 526–527.
3. Even someone as sympathetic as Garnet Hertz has major misgivings: 'does media archaeology as a displacement of the notion of media run the danger of making media archaeology even more marginal? Does displacement glorify the trivial, unfinished, and irrelevant without providing a synthesis? Part of the reason I ask this is that I see some of the same problems within the history of media arts practice: reveling in obscure technologies, projects continually stuck in prototype mode, and work that lacks a connection to 'real world' issues and politics. […] What is the value in being uncategorizable? Isn't part of the

task of mobilizing sidelined objects and discourses to make them legible and understood?' (Hertz 2010).

4. Siegfried Zielinski's anti-establishment instincts are particularly offended by the imperial gesture of revolution and innovation with which digital media promote themselves: '[…] judged to be a revolution, entirely comparable in significance to the Industrial Revolution […] every last digital phenomenon and data network [is] celebrated as a brilliant and dramatic innovation' (Zielinski 2006, 8).

5. Key figures that made the Brighton conference possible were in fact from an older generation, notably David Francis (from the National Film Archive, London) and Eileen Bowser (from MoMA, New York). Also present were John Fell (San Francisco State), John Gartenberg (MoMA), Paul Spehr and Martin Sopocy (Library of Congress). Among the younger generation, Tom Gunning, Charles Musser (and Noël Burch) had been nurtured by Jay Leyda's and Annette Michelson's courses at New York University in the 1970s. Their links with the New York/North American film avant-garde led to an especially lively cross-fertilization between film historians and film-makers in the subsequent decade.

6. By 'New Film History', I am referring to the intervention of a generation of scholars, beginning with Noël Burch and Barry Salt, and continuing with Charles Musser, Tom Gunning, André Gaudreault, Robert Allen, Kristin Thompson, Steve Bottomore and many others since. Some of the terms of the debate are set out in my 'The New Film History' (1986), and subsequently in the introductions to the various sections in T. Elsaesser (ed.), *Early Cinema: Space Frame Narrative* (1990).

7. The widely read, and in its heartfelt enthusiasm very enjoyable study by Arthur Knight, *The Liveliest Art* ([1957] 1972), first published in 1957 and revised in 1972, is one of the clearest cases of an organicist history, relying on great men to perfect the art of film and lead it to greater and greater realism.

8. At the Paris Exhibition of 1900, for instance, the Lumière Brothers projected their films on a screen that measured 16 by 21 m.

9. For a full account of the debate over *Life of an American Fireman*, see Gaudreault (1990).

10. See Elsaesser (2008) (reprinted in *Film History as Media Archaeology – Tracking Digital Cinema*), as well as, for instance, Paul Virilio (1989), Cartwright (1995), and Hediger and Vonderau (2009).

11. The subject of found footage and non-theatrical film has received extensive attention by scholars such as William Wees, Catherine Russell and André Habib.

12. For their work in reconceptualizing the history of sound in cinema, Douglas Gomery, Rick Altman and James Lastra would be among the names to cite.

13. Tom Schatz, Richard Maltby, Jon Lewis, Douglas Gomery and many others who studied changing business models, censorship, mergers, technologies, marketing, copyright, branding, etc., and thereby altered the way we think not only about contemporary Hollywood but also its previous history, would never call themselves media archaeologists.

14. In 'The 'Return' of 3-D' I propose one such model – that of the 'supplement' – but historians of television have elaborated their own. William Boddy, Lynn Spigel or John Thornton Caldwell would be the scholars that come to mind.

15. For the idea of premediation as a feature of the state control of the future (rather than corporate control), in the form of a combination of surveillance and action replay, see Grusin (2004, 2010).

16. As Wolfgang Ernst puts it: 'The crucial question for media archaeology, then, resides in whether, in this interplay between technology and culture, the new kind of historical imagination that emerged was an effect of new media or whether such media were invented because the epistemological setting of the age demanded them' (2013, 42).

17. On tropes, metaphors and narrative in structuring historical events, besides Hayden White's *Metahistory* (1973), see Elsaesser (1971).

18. There is an etymological link between telling and counting, whose history is explored by Ernst (2013, 147–157). See also Ernst and Farocki (2005).

19. Mary Ann Doane comments on Kittler in her chapter 'Temporality, Legibility, Storage: Freud, Marey and the Cinema' (2002, 63–64).

20. Writers on melodrama in the 1970s (Elsaesser, Mulvey, Nowell-Smith) were keen to point out that the stylistic excesses of this genre were part of a displacement, where conflicts, which could not – for ideological or psychoanalytic reasons – express themselves directly, manifested themselves obliquely in the film's 'body'. Best known is Nowell-Smith formulation: 'In the melodrama, where there is always material which cannot be expressed in discourse or in the actions of the characters furthering the designs of the plot, a [hysterical] conversion can take place into the body of the text' (Nowell-Smith 1977, 117). We can now rewrite such psychosocial critiques in terms of a media-archaeological or techno-materialist analysis and extend it to the cinema as a whole.

21. The split I am referring to may be related to but also different from the one noted by Erkki Huhtamo and Jussi Parikka, when they write that 'a binary division has usually been drawn between the socially and culturally oriented Anglo-American studies and the techno-hardware approach of German scholars, who have taken their cue from Friedrich Kittler's synthesis of Foucault, information theory, media history, and McLuhan's emphasis on the medium as the message. […] One way of explaining this division is to see it as a consequence of different readings of Foucault' (2011, 8).

22. 'Without this little device, we wouldn't have the film industry. 24-times a second it pulls the film forward with a jolt. It turns a rotating movement into pull-movement' (cited in Kirsten Hagen, 'Filmgeschichten sind wie Reiserouten' [Film stories are like itineraries], in Gellhaus et al. [2007], 333). See also Engell (1992, 35).

23. Heath also gives a very lucid account of Renaissance perspective and its impact on classical cinematic representation, using Hitchcock's *Suspicion* as one of his chief examples.

24. These three generations would comprise, among others, the names: Galileo (1564–1642) and Johannes Kepler (1571–1630), followed by René Descartes (1596–1650) and Frans van Schooten (1615–1661) followed by Christiaan Huygens (1629–1695), Baruch Spinoza (1632–1677), Robert Hooke (1635–1703) and Isaac Newton (1643–1727). Lens grinding, the optical microscope and the refracting telescope were perfected around 1600 in the Netherlands, while Hooke and Huygens refined the practical uses of the *camera obscura*. Assisting artists as a drawing aid since the days of Leon Battista Alberti (1404–1472), Leonardo da Vinci (1452–1519) and including Johannes Vermeer (1632–1675), the *camera obscura* was fitted with a lens by Giambattista della Porta (1535–1615) which in turn allowed Athanasius Kircher (1602–1680), to convert the *camera obscura* into a dual-lens-magnifying projection device, the *magic lantern*.

25. Gunning (2004, 31–44). In this context, Terry Castle offers 'essays on […] the dream-like world of the eighteenth-century masquerade, magic-lantern shows, automata, and other surreal inventions of Enlightenment science, and the hallucinatory obsessions of Gothic fiction.' (1996, dust-jacket). See also Warner (2006).

26. I am thinking of visual displays that 'fill' a space rather than be focused and bounded, utilized by artists, as in the works of Krzysztof Wodiczko and Doug Aitken, Anthony McCall and Mat Collishaw.

27. Anne Friedberg has tracked these developments in two studies, which build on each other (1993, 2006).

28. This last point implies once more that a certain subject position – one that translates physical fixity into psychic fixation – may be bound up with this mobility, making the cinema inseparable from commodity fetishism (a position often ascribed to Walter Benjamin), but also doubly re-inscribing perspective as both symbolic form and the vector of phantasmatic possession (polemically sharpened into a gendered asymmetry in Laura Mulvey's theory of the 'male gaze').

29. As an aside, it is worth reflecting on the fact that contemporary social media persuade us that every relation we have with the world is a subject–subject relation (in the form of friending, sharing, re-tweeting etc.), rather than a subject–object relation (as in the cinema). Yet closer to the truth may be that the companies which control these social media, as they aggregate our subjectivities, de facto treat us as objects, i.e. as primary sources of raw data, so that these subject–subject relations (the so-called 'network effects') are merely the cover-up for object–object relations.

30. A further point should be added. If one follows the traditional genealogies of cinema – camera obscura, laterna magica, monocular perspective, a fixed geometry of representation, the photographic ontology – then, the arguments for why this form of cinema is obsolete are not only hard to refute, but also helps to explain why certain media archaeologists are right in showing little interest in the cinema, as they attempt to reverse engineer the future, in order to better manage the present.

31. I have written about André Bazin as media archaeologist at greater length elsewhere (Elsaesser 2012).

32. Huygens (1657). See also Hald (1990, 106).

33. Huygens (1690). For a more detailed account, see Shapiro (1973).

34. Hal Foster, too, seems not entirely convinced that these hopes are still tenable: 'For the Surrealists to haunt these outmoded spaces [i.e. 'the arcades and interiors, the exhibitions and panoramas'], according to Benjamin, was to tap 'the revolutionary energies' that were trapped there. But it is less utopian to say simply that the Surrealists registered the mnemonic signals encrypted in these structures-signals that might not otherwise have reached the present. This deployment of the outmoded can query the totalist assumptions of capitalist culture, and its claim to be timeless; it can also remind this culture of its own wish symbols, and its own forfeited dreams of liberty, equality and fraternity. Can this mnemonic dimension of the outmoded still be mined today, or is the outmoded now outmoded too – another device of fashion?' (Foster 2002, 195–196).

35. Mark Zuckerberg, on acquiring the VR system Oculus for Facebook, proclaimed that 'Oculus's mission is to enable you to experience the impossible. Their technology opens up the possibility of completely new kinds

of experiences.' This oxymoronic 'possibility of experiencing the impossible' was advertised under the heading: 'The Samsung Gear VR Is Your Window Into The Future', accompanied by the picture of a man peering at us while wearing a headset that effectively makes him blind to his surroundings. http://techcrunch.com/2015/11/20/samsung-gear-vr/?ncid=rss&utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+Techcrunch+%28TechCrunch%29 last accessed 20 November 2015.

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