UBIQUITOUS COMPUTING, COMPLEXITY, AND CULTURE

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The ubiquitous nature of mobile and pervasive computing has begun to reshape and complicate our notions of space, time, and identity. In this collection, over thirty internationally recognized contributors reflect on ubiquitous computing's implications for the ways in which we interact with our environments, experience time, and develop identities individually and socially. Interviews with working media artists lend further perspectives on these cultural transformations. Drawing on cultural theory, new media art studies, human–computer interaction theory, and software studies, this cutting-edge book critically unpacks the complex ubiquity-effects confronting us every day.

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CUTTING AND FOLDING THE BORGESIAN MAP

Film as Complex Temporal Object in the Industrialization of Memory

Patricia Pisters

"Memory fades. Even your most important moments slip away over time. And when you die, they will disappear forever. But not anymore. Surgically implanted into your child before birth, the Zoë Chip will record every moment, from birth to death, enabling their entire life to be enjoyed again and again by future generations."[1] This description of the film *The Final Cut* does not sound that much like science fiction in the age of ubiquitous computation. As Ulrik Ekman has shown in *Throughout*, contemporary life is permeated with a wide range of conspicuous and inconspicuous forms of technical mediation, ranging from micro-cameras to radio-frequency identification (RFID) chips, from pervasive surveillance grids to mobile and locative media to augmented realities, interactive cloths and ambient urban computing (Ekman 2013). In this chapter, I will focus on one particular aspect of the ways in which ubiquitous computing intervenes in our life, namely in negotiating a more complex understanding of temporal relations. *The Final Cut* may present a world were brain implanted cameras allow total recall of our lives, reproducing it like a Borgesian map (Borges 1999, 325). However, in order to sustain and make sense of life and death, we still need to select, cut, and edit. These memory processes are increasingly technologically mediated as well. As Niklas Luhman asserts, in our high tech society, memory and temporal relations have become increasingly complex processes that call for new ways of understanding temporal dynamics.[2] Films such as *The Final Cut* and contemporary cinema more generally provide us with images and stories that tell us something about these complex enfoldments of time mediated by ubiquitous computing. In an engagement with Gilles Deleuze's cinema books of the 1980s, I have described contemporary cinema as "the neuro-image" (Deleuze 1986; 1989; Pisters 2012). The thought of the neuro-image is indebted to Deleuze's philosophy of cinema and time but brings this to a digital epoch. In order to allow a more explicit technological, critical, and complex engagement with cinema as co-constitutive of complex temporalizations and eventualizations of life, this chapter stages an encounter, perhaps surprising, between Deleuze and Bernard Stiegler's *Technics and Time* (Stiegler 2009; 2011).

Tertiary Retention: Cinema as Temporal Object

Before zooming in on contemporary cinema of the digital age, it is important to establish the ways in which cinema as a media technology is not just a representation of what is going on in the real world, but a matter of a technology co-constitutive of our being. While Deleuze's cinema books are a rich conceptual source for understanding the immanent power of cinema, his engagement with media technology as such remains quite implicit. More explicit on this, Bernard Stiegler in his three volumes on *Technics and Time* proposes a reorientation (or "disorientation") of philosophy by conceiving technology and humanity as co-dependent, notably in the conjunction between technics and time. Stiegler defines technics as "a process of exteriorization [that] is the pursuit of life by means other than life" (Stiegler 1998, 17). He engages with industrially produced "analogico-numeric apparatuses," such as film, television, and computer networks, and demonstrates their profound influence and constitutive role for both individual and collective consciousness and temporality (Stiegler 2009, 111). To rethink time in relation to technology, Stiegler returns to Husserl who made an absolute distinction between primary retention, as the perception of time in the living present; secondary retention, defined as the imagined past as memory; and finally, recorded or mediated time, which Husserl called consciousness of image, a concept that Stiegler replaces with the concept of tertiary retention (Stiegler 2011, 16). Contrary to Husserl, however, Stiegler argues that primary and secondary retention are enfolded into one another by virtue of the fact that each primary perception is already colored by memory, and that this is a never-ending process. Moreover, he argues that tertiary retention, and any form of recorded or mediated memory ("objective memory" that is not necessarily lived on a personal level), does not come after primary and secondary retention but *precedes* other forms of memory: consciousness is fully entangled with and in large parts determined by mediated temporal objects. While the age of pervasive computing is heavily influenced by networks of digital objects, it is important to keep the temporal nature of cinema (analog or digital) in mind as fundamentally related to consciousness. As Stiegler explains in the third volume of *Technics and Time*:

> [C]onsciousness is *already cinematographic* in its principles of selection for primary memories, a selection that relies on criteria furnished by the play of secondary memory and associated tertiary elements, the combination forming a montage through which a unified flux is constructed (as "stream of consciousness"), but which is identical in form to the cinematic flux of an actual film, as a temporal object and as the result of a constructed montage.
>
> (Stiegler 2011, 17–18)

Selection, forgetting, and reduction are necessary for a present to pass and for a past to be selected from. This process is heavily mediated by a cinematographic apparatus. This is what Stiegler calls the "retentional finitude," that is, the "grounding condition of consciousness-as–temporal-flux" (Ibid. 20). Stiegler is not speaking in metaphorical terms here. He returns, for instance, to *Intervista* (1987) where Fellini himself, together with Marcello Mastroianni (and a crew from Japanese Television), visits Anita Ekberg at her house (Stiegler 2011, 22–24).[3] Together they watch again Mastroianni and Ekberg's performance as young actors in in *La Dolce Vita* (1960). Mastroianni, the actor in *Intervista* in the 1980s, talks to Sylvia on screen, the thirty years younger version of Ekberg in *La Dolce Vita*, while the now much older actress is sitting next to him. This properly cinematographic event, as Stiegler calls this scene, is very moving precisely because of the psychic and collective experience of time that it presents to us.

In his books on cinema, Deleuze also demonstrated how, in all Fellini's work there is a confusion of levels of the actual and the virtual, past and present, dream, memory, and the

present, always already mediated by the cinematograph (or other media).[4] These "crystals of time," as Deleuze called them, demonstrate to us how deeply tertiary retention, as an impersonal principle, is indeed at the basis of our experience of time. I will return to these points but for now it is important to see that Deleuze's time-image is actually entangled with a technologically mediated form of time. Stiegler's concept of tertiary retention allows a more explicit acknowledgment of the constitutive role of technics in human consciousness: "consciousness functions just like cinema which enables cinema and television to take it over."[5]

Individuation and the Industrialization of Memory

Recognizing this power of the cinematographic object as a fundamental co-evolutionary aspect of the consciousness (mind) and media technology means that we have to ask what this exteriorization of our nervous system by a process of industrialization means for the understanding of who we are.[6] In this respect, Gilbert Simondon's theory of the individual as a meta-stable entity resulting from an ongoing process of individuation (rather than as a substance or stable category) is important for both Stiegler and Deleuze. Stiegler and Deleuze speak from very different traditions in philosophy (Stiegler departing from Husserl and Derrida; Deleuze following from Bergson, Spinoza, and Nietzsche). I do not intend to erase these differences between Stiegler and Deleuze, and I return to this further below. However, via this notion of a pre-personal field that is constitutive for us as individual as well as collective consciousness, an interesting encounter between Stiegler and Deleuze might be possible.[7] For Simondon, it is impossible to conceptualize the (human or non-human) "individual" as anything other than as an assemblage of dynamic relations that operate on a "pre-individual" level. Temperature, pressure, shock, and all kinds of other forces operate as information on organic and non-organic beings (such as technology, or rocks) that transform them by transduction. As Simondon explains:

> This term [transduction] denotes a process—be it physical, biological, mental, or social—in which an activity gradually sets itself in motion, propagating within a given area, through a structuration of the different zones of the area over which it operates. Each region of the structure that is constituted in this way than serves to constitute the next one to such an extent that at the very time this structuration is effected there is a progressive modification taking place in tandem with it. The simplest image of the transductive process is furnished if one thinks of a crystal, beginning as a tiny seed, which grows and extends itself in all directions in its mother-water. Each layer of molecules that has already been constituted serves as the structuring basis for the layer that is being formed next, and the result is an amplifying (sic) reticular structure. The transductive process is thus an individuation in progress.
>
> (Simondon 1992, 313)

Stiegler argues that the industrialization of memory functions as a pre-personal schematism that allows transindividual (and transindividuating) circuits of processes of individuation as "the adoption of both new lifestyles brought about by technical changes and retentions of a collective past that was never lived, made accessible by technical prostheses and allowing for transplants, migrations, assimilations, and fusions (. . .)" (Stiegler 2011, 60). As with the virtual in time-image described above, Deleuze does not explicitly refer to the pre-personal aspects of media technology *as technics*, but he does recognize the pre-individual and a-subjective field in any experience of perception and memory, which he refers to as the impersonal field of the

virtual (Deleuze 2002). The actual (subjectivized) and the virtual (pre-personal) always form a continuously changing circuit: "The relationship of the actual and the virtual forms an acting individuation or a highly specific and remarkable singularization which needs to be determined case by case" (Deleuze 2002, 152). And the circuit between the actual and the virtual is a never-ending process of individuation as crystallization. In *The Movement-Image* and *The Time-Image*, Deleuze has demonstrated how the actual and the virtual translate in different ways in these two different modes of cinema. With Stiegler's techno-ontological insights in mind, we can say that by implication Deleuze shows how powerfully these technologically mediated images operate in processes of individual and collective memory, in psychic and collective individuations. While he acknowledges the existence of "bad cinema," Deleuze, however, focuses almost exclusively upon masterpieces of Western cinema (of both popular and art house cinema), sharing his profound insights into this dimension of collective audio–visual culture that continues to transduct our individuation processes.

Speaking from a more deconstructive and Derridean perspective, Stiegler is critical of the legacy of cinema and audio–visual culture (Derrida and Stiegler 2002). He is wary of the schematization of media formats and contents that also have the capacity to colonize and disindividuate the psyche with toxic consumerism and hegemonic schemata of a marketing solutionism that is as ubiquitous as our computational machines and comes to occupy the "pre-individual field" in a poisonous way. Stiegler calls this the malaise of our age that is triggering an "immense systemic stupidity" (Stiegler 2013, 131). Instead of allowing transindividual circuits of individuating *adoption*, he argues, the techno-logical system easily gives way to (slavish) *adaptation* to the norms of the business model. Based on the same pre-individual field, a being individuates (or disindividuates) as a metastable and transductive unity that changes and is transformed in the encounter with new potentialities that are capable of expressing both health and toxicity.

So how to find new criteria for evaluating the cinematographic mediations and the "industrialization of memory"(Stiegler 2009, 97–188)? Here we have another point where Deleuze and Stiegler might meet productively. While the pleasures of aesthetic appreciation and other more traditional criteria for valuing film remain significant, for both Deleuze and Stiegler it is more important to take to heart Fellini's insight about his invented memories and understand that the fabulatory structure and the performative quality of mediated stories have a (re)constitutive role in our (collective) memory, and hence in determining who we are and what we might become (Steigler 2011, 174–175). This is not inherently a bad thing; it merely asks us to think in new ways about what these mediated images or fabulations do. Looking at cinema in this way, one can see what Deleuze means by "the powers of the false": that, paradoxically, it can be both deadly and creatively productive (Deleuze 1989, 126–155). This also allows us to understand the problem with which Stiegler urges us to engage, namely, an "[a]nalysis of the critical condition of technoscience" so as to establish a criteriology for judging the quality of its fictions. According to Stiegler, a working through of the question of knowing what we want requires a re-examination of what/how the *technical life* (inventing, fabricating) actually is—something that "has always already shaken every axiomatic ontology at least since the appearance of the first stone tools four million years ago" (Steigler 2011, 205–206). Fabulation is not only at the core of cinema as Deleuze proposes in *The Time-Image*, but in its relation to technology it is also at the core of life. Deleuze argued (with Bergson) that "consciousness has become camera–consciousness" (Deleuze 1989, 23). In addition, Stiegler allows us to see that cinematographic consciousness is part of a fundamental technoscientific fabulatory flow that is yet again transformed in and by the digital era.

Even if it is not a masterpiece of cinema, *The Final Cut* could be considered as a meta-film that thematically addresses quite explicitly what happens with individuals in an age of ubiquitous computing, omnipresent cameras, and techno-flow. The film presents a world where "the problem of forgetting" has been overcome by unobtrusive and pervasive camera and computer technology, a "solution" offered by a multi-billion dollar company called EYE-Tech. Alan Hakman (Robin Williams) is a "cutter" whose job it is to edit footage taken from the brain implants of deceased people. In a way Alan Hakman could be seen as an embodiment of tertiary retention: he is the one who, after somebody's death, will select, cut, and compose a life into a 90 minute film that is shown to the deceased person's loved ones in a "Re-memory Ceremony." *The Final Cut* thus explicitly addresses the technoscientific aspect of memory and rememorization as part of an industrialization process. The Zoë implants are expensive and not everybody can afford such a memo-device for their new-born baby, while at the same time pervasive EYE-Tech publicity for the implant imposes it as the sociocultural norm. Throughout the film there are many references to the ethical concerns for psychic well-being that are implied in the implant (for instance, people committing suicide when they find out about the implant because of the unbearable thought that all of their life would be re-playable to others instead of remaining processed in the inner life, or survivors who become addicted to the Zoë footage of a loved one). These economic, social, and ethico-philosophical concerns are expressed by a resistance group that is fighting against the implant, organizing demonstrations, and providing tattoos that mess up the audio and video signal for recording and replaying. In this admittedly very explicit way, *The Final Cut* questions the toxic effects of industrialization on memory.

Hakman reconstructs the life-stories of his clients, choosing from the hundreds of thousands of life hours recorded directly on the brain-screen, classified in a huge audio-visual database categorized under tags such as "childhood," "sleep," "eating," "awkward face," "temptation," "personal hygiene," "career," "tragedy," etc. When at work behind his supercomputer, we see a human/non-human "analog-numeric apparatus" at work, searching, selecting, and editing that which becomes retroactively the story of a life. What is interesting is that the database categories that Hakman can search do refer to some sort of impersonal field.

Even if all the images contained in the database are of a specific individual, they are all related to something pre-personal: to sleep, to eat, to be tempted, etc. The complete exteriorization and objectification of these myriad events demonstrate, on the one hand, how natural (mental) processes of individuation is a selection and recombination of pre-personal events into the story of "a life." It is at the moment of death that this dimension reveals itself most clearly. Deleuze gives the famous example of the Dickens' story in which a rogue, held in contempt by everyone, is found as he lies dying: "Suddenly, those taking care of him manifest an eagerness, respect, and even love, for his slightest sign of life. (. . .) The life of the individual gives way to an impersonal yet singular life that releases a pure event freed from the accidents of internal and external life" (Deleuze 2001, 28). On the other hand, it is Hakman who has the selection of the eventualization and temporalization of "a life" in his hands, a life that he individuates into a story through the creation of a re-memory film. Obviously, this is a huge responsibility, and is portrayed as such in the film. However, what makes the film more interesting is that we can see Hakman not just as a character within a contemporary science-fiction story, but rather as an allegorical figure, a conceptual persona even, who shows us something about the way in which temporalization and eventualization work as complex forms of mediation in ubicomp culture today (Deleuze 1994, 64–66).

The Neuro-Image and the Third Synthesis of Time as a Complex System

The Final Cut does not problematize the externalization of memory as *opposed* to the materiality of human embodiment but presents it as a new problem that emerges from a "compositional co-existence," a co-development between the technical and the human. Stiegler refers to a co-individuation of human organs, technical organs, and social organs qua an "organology."[8] Since our technologies are entangled not just with our bodies as physical prosthesis, but also with our minds as cognitive prosthesis, it is important to rethink memory both as something cerebral and extra-cerebral. This connection between our image technologies and our brains provides another meeting point between Stiegler and Deleuze, albeit a more contemporized Deleuze. Already in the 1980s, Deleuze argued that cinema is a temporal object that is related to our consciousness, and even to the materiality of our brain screen. "The brain is the screen," he famously postulated in *Cahiers du Cinema* (Deleuze 2000). In a Bergsonian vein, Deleuze conceptualizes the cinematographic image as both material and immaterial facet of consciousness.[9] The movement-image and the time-image, the two different modes of cinematographic techno-aesthetics that Deleuze distinguishes, are each in their own way connected to a particular temporality. Movement-images (classical genre cinema) give us indirect temporal relations through a spatial logic of continuity montage. Time-images (modern post-war cinema emerging from Italian neo-realism) give us direct images of time without the spatial logic of linear continuity. In these modern post war images, it becomes hard to distinguish the actual (present) from the virtual (past) and time is already a more complex notion.[10] In our digital age, however, we should perhaps conceive of another dominant mode of cinematographic techno-aesthetics with an even more complex temporal architecture. Due to its profound entanglement with cognitive capitalism, ubiquitous computing, and a mental organology (man as "neuronal man"), I propose to call this "the neuro-image."[11] The most salient and obvious characteristic of the neuro-image is that we no longer just follow characters in their actions, nor do we look through their wondering and wandering eyes, but we experience directly the brain-worlds of its protagonists, sometimes indicated because characters are hooked up to some kind of brain machine, but very often without warning, for instance, entrapped in a schizoid delusionary world.[12] To be sure, the movement-image and time-image were also connected to the brain-screen. However, the entanglement of brain and consciousness with our contemporary media screens has intensified to a point where new temporalizations emerge.

Deleuze saw in cinema a particular mode of thinking that was close to both philosophy and to neuroscience. However, what might a new neuro-image mode of cinema bring to the discussion of ubiquitous computing culture and its inherent complexity? The neuro-image is part and parcel of a networked digital culture that operates with the logics of extended and complex narratives, networked software cultures, and database remixability. This is better understood by looking more closely at the specific and complex temporalization of the neuro-image. For this I have proposed to re-read Deleuze's cinema books in line with the philosophy of time that Deleuze develops in *Difference and Repetition*. Even if Deleuze does not explicitly refer to complexity theory, the thought system of difference and repetition developed in this book, and especially the conceptualization of time is a complex dynamic system that is marked by self-referentiality (feedback loops), emergent self-organization in serialized patterns, and radical contingency.[13]

As with Stiegler, Deleuze proposes time as a passive synthesis, in which the first synthesis is the living present that we embody in the here and now of our sensory-motor habitual behavior.

However, this foundation in the present of the first synthesis is grounded in the second synthesis of memory, the past in general that makes the present pass. In this ground of the pure past all layers of time co-exist. These notions of first and second syntheses are inspired by Bergson's thought of matter and memory (Bergson 1991). Each synthesis of time has its own relation to and conception of the past, present, and future, so we are already entering a complex temporal system. There is a third synthesis of time as well, which is time conceived from the future as such and this form of time is highly contingent and opens up to a growing complex temporal architecture. The third synthesis of time as developed by Deleuze is not the same as Stiegler's concept of tertiary retention. But before returning to Stiegler, let me develop the temporal complexity of the neuro-image.

In *The Neuro-Image* I suggest that Deleuze's cinema concepts can be seen in light of the syntheses of time developed in *Difference and Repetition*.[14] In this way, it is possible to argue that the movement-image has as its dominant temporal mode of expression, the first synthesis of time. The images have a firm foundation in the present; even flashbacks are anchored in a present that is stable and that we can always recognize as our spatial and temporal point of orientation. The time-image has the past, or the second synthesis of time, as its dominant temporal color. Here the co-existent layers of the past begin to speak for themselves. They pop up without warning, without firm anchors in the present, as in the confusion of both individual and collective pasts and present.[15] As already indicated, in the time-image, time, film aesthetics, and narration already become more complex, since the virtuality of the (traumatically) returning past is sometimes indistinguishable from the actual, as is clear in Fellini's films. However, it is the third synthesis of time, the futural, which is of primary import in the neuro-image as the cinematographic form of the digital age.[16] As Deleuze explains in *Difference and Repetition*, the first synthesis and the second synthesis both have their own conceptions of the future (thinking the future either from the present as anticipation or from the past as cyclic or determined repetition).

It is in the third synthesis of time that the future *as* future presents itself as the temporal modality. In the third synthesis of time the future does not follow from what we know of the present or of the past, but it is the speculative and ungrounding dimension of time (Deleuze 1994, 90–91, 93–94). Here Nietzsche's ideas of death and eternal return are added to the Bergsonian ideas of matter and memory. Deleuze argues that while repetition in the eternal return excludes the repetition of the same, the third synthesis "cuts, assembles, and orders" to make possible the eternal return of pure difference (Williams 2003, 103). It is worthwhile noticing that Deleuze's third synthesis of time is a modern conception of the future, akin to that proposed by Niklas Luhmann as a modern temporal structure that only emerged, and had to emerge, in highly complex and highly technologically mediated modernity. Luhmann asserts that the future now becomes an open future: "Future itself . . . must now be conceived as possibility quite different from the past . . . It may contain, as a functional equivalent for the end of time, emergent properties and not-yet-realized possibilities" (Luhmann 1976, 131). Luhmann calls for a complex systems theory conception of time in which an open conception of the future allows "possible divergence of past states and future states" as well as "several mutually exclusive future presents" (Ibid., 136, 140). Even without completely unfolding Luhmann's complexity-in-time, one can see how this corresponds to Deleuze's open conception of the future in the third synthesis of time. This complex synthesis of time contains all other times (the past, present, and future of the first and second syntheses) *and* it opens up to all possible (not-yet-realized) past, presents, and futures that present themselves as serialized sequences. It is the third synthesis of time that encompasses "the totality of the series and the final end of time" (Deleuze 1994,

94). Luhmann and Deleuze seem to agree that society today has to "sequentialize predictions and actions into complex self-referential patterns" (Ibid., 145). Complexity has to be reduced in order to make sense, but, seen from various different points (or scenarios) in the possible future, things could have been different. Here we see the radical contingency of complex temporality conceived as third synthesis or open future.

Let's make this more concrete. The future is also dramatically and ontologically related to the event of death and even "the end of times." In *The Final Cut*, it is only at the moment when a person has died that the cutting and ordering is done as a "re-memory" from the point of view of what we want to remember for and from the future. However, since the future as such is always speculative and involves many options remixing can happen *ad infinitum*. It is always possible to imagine a different future scenario from which to fold back in time, re-order, and recut the events of a life into a different story, and end up with a remixed version of the past. Alan Hakman, at work on his computer with the database of all the events in a life of a deceased person, has to choose which story he will tell. Clearly, depending on the kind of future memory he (or his client) wants to retain, he cuts, re-orders, and reduces in different ways. Moreover, as Maria Poulaki has pointed out, *The Final Cut* presents reflexive feedback loops of complex narration where narrative closure is no longer possible:

> [F]ilms such as the *Final Cut* appear concerned not just with the technological incarnations of information, but also, and perhaps even more, with their own ability to communicate as potential information entities. Complex films are self-reflexive regarding their own cyborg nature—which has for long been underlying modern narratives—and "make explicit, to varying degrees, the technological underpinnings of narrative mechanism."[17]

And, as she further indicates, when Hakman by accident discovers that he himself has a Zoë implant, the feedback loops enfold even further and in ever more complex ways when he returns to his own "database of memories" where he discovers "a different past" than the one he was replaying in his traumatized memories.

This self-referential looping and modulating of time can be viewed as an allegory for our times of ubiquitous computing, where all the events of our lives, of world history even, can be captured and tagged with metadata only to become subject to re-assembly into new life stories and world histories. These stories become, more explicitly than ever before, parallel stories of the endless potential stories that could be told. To put it in cinematographic terms, we see here neither just a classic flashback that fits in an anchored present and continuity logic, nor just a crystalized time of post war cinema that brings the past as a direct layer of cyclic repetition into the present. Rather, the past now becomes like a feedback loop on parallel processors: From different points (of view) in the future, we can re-order the events of our life (or of history) into multiple stories. The tagline of *The Final Cut* "Would you live your life differently" points to the endless possibilities to rewrite history in a culture where so many audio-visual documents (fiction and non-fiction) have been stored in databases. This has important political implications, which are beyond the scope of this article. But clearly, trying another version of (individual or collective) history informs the choices that are constantly made in folding the Borgesian map in different ways in order to create a different version of the past always from a different future scenario.[18] The obsession with the future we also recognize in a different way: ubicomp, Big Data, and endless information have allowed that polling, profiling, prediction, prevention, and preemptiveness have entered our socio-political structures and increasingly determine politics and policing.[19] In this sense the neuro-image is part of, and

perhaps even an aesthetic expression of, a much larger network of pervasive computing and the database logic of our age.[20] Without claiming that all knowledge and all data come together in one big networked system, the fact that it has become much easier to recognize patterns, sketch possible scenarios, and make new selections of the past based on these possible futures, is related to the privileging of the third synthesis of time characteristic of the neuro-image.

Although Deleuze does not explicitly treat of technology in *Difference and Repetition*, nor of the three syntheses of time in his cinema books, I think that the link between the neuro-image and the complexity of the third synthesis of time becomes tangible when considered as a form of tertiary retention which Stiegler posits. Here it is important to note another difference between Stiegler and Deleuze. Tertiary retention as defined by Stiegler is in fact strongly related to memory—it is a techno-premediation of memory, one might say. Deleuze's third synthesis of time, as we have seen, is related to the future as future, and does not necessarily relate to techno-mediation.[21] However, the scene in *Intervista* that Stiegler discusses in *Technics and Time 3*, for instance, is not just a premediated memory. It also prefigures a computational database logic of our epoch in which tertiary retention is colored by a future from which it speaks. As a sort of *YouTube* mash-up *avant-la-lettre*, Fellini has re-cut and re-edited the scenes from *La Dolce Vita*. In this way he comments upon the particular retentive significance the film has acquired in our collective memory, which, seen from the moment the original film was made, is a point in the future. Mastrioanni and Ekberg will live on as iconic lovers despite the fact that this is certainly not how they were presented in the original film. They have been recut from a point of view of the future.

Moreover, what makes this scene from *Intervista* very moving, is related to the fact that the mediated layers of time also anticipate another future, namely the future of old age and death, characteristic for the third synthesis of time. We see the actors as radiant adults, *and* when they are in the autumn of their lives. Implied in this is death: Mastrioanni has died in 1996, Ekberg passed away in 2015 at the time of this writing. Death in general is what lies ahead of us all. Stiegler refers to the categories of attention (present), retention (past), and protention (future) that can be synthesized in different ways. He argues that the resultant complex interplays of temporal dimensions are built on the anticipation of (our own) aging and eventual death (as "archi-protention" which is part of a deep unconscious core of our consciousness).[22] Both the archi-protention (our future death/death as an impersonal fact of the future) and the fact that tertiary retentions are related to forms of "objective memory" (cinematogram, photogram, phonogram, writing, painting, sculpting) that bear witness of a past not necessarily phenomenologically lived, bring Stiegler's techno-scientific argument respecting tertiary retention in contact with a Deleuzian conception of the third synthesis of time (Stiegler 2011, 28). Or, perhaps it is more correct to say that tertiary retention as archi-protention is related to the third synthesis of time of the neuro-image. Bringing Deleuze's cinema books and philosophy of time in contact with Stiegler's reflections on technics and time, provides a complex understanding of how our psychic and collective processes of "impersonal individuation" might be controlled as the techno-industry gets deeper under our skin and skull. Asking ourselves "who selects, and by what criteria" (Ibid., 223), and understanding that there actually never is a final cut, might keep us going, critically and creatively, recutting and refolding the Borgesian map for our rebirth and after-life in the eternal return of what has not-yet-been.

Notes

1 Press Information sheet *The Final Cut*, 35 mm Film, directed by Omar Naim (2004; Los Angeles and Berlin: Lions Gate Entertainment and Cinerenta Medienbeteiligungs KG, 2005), DVD.

2 Niklas Luhmann, "The Future Cannot Begin: Temporal Structures in Modern Society." Luhmann argues here for a complex understanding of time that matches the complexity of society: "Older societies did not produce such an elaborated framework, and they did not need it to understand themselves. They lived . . . within a less differentiated time" (149).

3 Stiegler also discusses films by Resnais, Antonioni, and Hitchcock.

4 Deleuze, *The Time-Image*, 68–97. Fellini had a vivid interest in the media. The Trevi Fountain scene, for instance, was a real event that had been covered in Roman newspapers in 1958 when Anita Ekberg spontaneously had jumped into the fountain. See Sam Stourdzé, Ed., *Fellini*, 124.

5 Stiegler, *Technics and Time, 3*, 77. Stiegler speaks of the "arche-cinema of consciousness" in "The Organology of Dreams," *Screening the Past*, June 2013, www.screeningthepast.com?2013?06?the-organology-of-dreams-and-arch-cinema.

6 Stiegler, *Technics and Time, 2*, 116. See also Ben Roberts, "Cinema as Mnemotechnics: Bernard Stiegler and the Industrialization of Memory."

7 In *Etats de Choc* Stiegler criticizes Derrida for not having understood the specific way in which Deleuze in *Difference and Repetition* departs from a Simondonian perspective of psycho-social individuations.

8 See for instance Stiegler's audio-visual lecture "General Organology, Digital Studies and the Neurosciences," *YouTube*, May 1, 2013, http://youtube.com/watch?v=0Hr2HYqE968

9 See "The Universe as Metacinema" and "Material Aspects of Subjectivity" in Pisters, *The Matrix of Visual Culture: Working with Deleuze in Film Theory*,14–77.

10 For instance, Deleuze compares the temporal architecture of the time-images of Alain Resnais to the Baker's transformation in mathematics. *The Time-Image*, 119. Deleuze refers to Iliya Prigogine and Isabelle Stenger, *Order out of Chaos*, 267–280. The Baker's transformation is a complex transformation in conservative dynamical systems in that all values can be determined and are not contingent.

11 Pisters, *The Neuro-Image*. Deleuze was influenced by Jean-Pierre Changeux's book that appeared in the early 1980s and had a huge impact in France. Cf., Jean-Pierre Changeux, *Neuronal Man: The Biology of Mind*. See also Raymond Bellour, "Deleuze: The Thinking of the Brain." Stiegler refers to Changeux's work in *Technics and Time, 2*, 169–170.

12 In films such as *The Eternal Sunshine of the Spotless Mind* (Gondry, 2004) to *Divergent* (Burger, 2014), action literally takes place in the brain. For explicitly schizoid films are we can think of *Fight Club* (Fincher, 1999) and *Shutter Island* (Scorsese, 2010).

13 Gilles Deleuze, *Difference and Repetition*, 70–128. For a general theoretical introduction to complexity in social organizations and an interesting case study, see Donde Ashmos Plowman et al., "Radical Change Accidentally: The Emergence and Amplification of Small Change." While complexity theory presents many different positions that allow more or less determinism, hierarchical organization, or contingency, as demonstrated by the variety of the contributions in this book, I will suggest that Deleuze's philosophy of time resonates with Niklas Luhmann's social systems theory and his conceptions of (temporal) differentiation. See Niklas Luhmann, "The Future Cannot Begin." See also Niklas Luhmann, *Social Systems* and *Introduction to Systems Theory*.

14 Pisters, *The Neuro-Image*, 127–155. See also Pisters, "Synaptic Signals: Time-Traveling Through the Brain in the Neuro-Image," 261–274.

15 As for instance in *Hiroshima Mon Amour*, 35 mm Film, directed by Alain Resnais (1959; Paris and Tokyo: Argos Films, Como Films and Daiei Studios, 2003), DVD; See Patricia Pisters, "Flash-forward: The Future is Now."

16 There are countless ways in which the neuro-image expresses this obsession with the future. For instance, *Inception*, 35 mm Film, 65 mm Film, Digital, directed by Christopher Nolan (2010; Los Angeles: Warner Bros, Legendary Pictures and Syncopy, 2010, DVD) is told from a point of view of the future (old age or perhaps even death of the main characters). *Minority Report*, 35 mm Film, directed by Steven Spielberg (2002, Los Angeles: Twentieth Century Fox, Dreamworks, Cruise/Wagner Productions, 2002, DVD) shows us a world where crime is prevented via predictions from savants that can see the future on their brain-screens.

17 See Poulaki's chapter elsewhere in this volume. Here the reference is to Maria Poulaki, *Before or Beyond Narrative? Towards a Complex Systems Theory of Contemporary Films*, 29–30. Poulaki quotes Allan Cameron, *Modular Narratives in Contemporary Cinema*, 25. See also Warren Buckland, Ed., *Puzzle Films: Complex Storytelling in Contemporary Cinema*.

18 To give an example, the films of John Akomfrah deal explicitly with re-ordering and refolding the audio-visual archive of Britain's migration history, which changes our perception of that history as well as creates new images for the future archive. See for instance, *The Nine Muses*, Digital, directed by John Akomfrah (2010; London: Smoking Dogs Films, 2012), DVD.

19 For a popular account of the emergence of a "new and complex future" after 9/11, see James Canton, *The Extreme Future: The Top Trends that Will Reshape the World in the Next 20 Years*, x. For a report on the pervasiveness of ethnic profiling, see the report *Ethnic Profiling in the European Union*. As regards the use of ubiquitous computing for behavior profiling, consider Louis Atallah and Guang-Zhong Yang, "The Use of Pervasive Sensing for Behaviour Profiling – A Survey." One also recalls the pre-emptive war on Iraq that was based on the expectation of a future threat, not on a past assault.

20 See also Anna Munster, *An Aesthesia of Networks: Conjunctive Experience in Art and Technology*. Munster counters the pervasiveness (and flattening uniformity) of different data networks (which she calls "networked anesthesia") with aesthetic experience that engages with these networked databases.

21 Granted, a more nuanced position on this point is called for if one were to take into account the works that Deleuze has undertaken with Félix Guattari. *A Thousand Plateaus*, for instance, is full of machinic assemblages, war machines, abstract machines, the techno phylum, and the mecanosphere.

22 Stiegler, *Technics and Time, 3*, 27. On archi-protention, Ibid., 17, 30.

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