Time and the digital: whitehead, deleuze and the temporality of digital aesthetics

Author:
Barker, Timothy Scott

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TIME AND THE DIGITAL

Whitehead, Deleuze and the Temporality of Digital Aesthetics

Timothy Scott Barker

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For Michelle and Chloe

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ABSTRACT

The aesthetics of digital art seem to be inextricable from time and process. Surprisingly though, interaction with digital systems has traditionally been marked by spatial concepts and metaphors, positioning the aesthetics of interaction as a convergence of spaces where data and agents 'meet'. This preoccupation with space has placed restrictions on aesthetic theories that seek to represent interaction with digital systems. Within this dissertation, I argue that questions of time and the more specific questions of the temporal and 'temporalising' nature of interaction have been neglected. Through a process-oriented investigation of interactive digital art works, produced by a range of artists such as George Legrady, Jeffrey Shaw, along with Dennis Del Favero, Peter Weibel and Neil Brown and Christa Sommerer and Laurent Mignonneau, I address this problem and propose a temporal aesthetic theory of interaction. I thus offer a specific understanding of digital aesthetics in which the process of interaction is foregrounded.

I work towards this aesthetic theory of interaction by firstly enacting particular tenets of A. N. Whitehead's process philosophy and Gilles Deleuze's philosophy of time, informed by Brian Massumi, Manuel DeLanda and Michel Serres. These thinkers are used to develop a theoretical framework that centres on an understanding of time, process and the event. Directed by this framework, I firstly investigate several non-interactive works by David Claerbout, Bill Viola and the installations of Dan Graham. This investigation of non-interactive works provides the grounding from which I argue that the digital *re*-presentation of events produces a particular type of time. Thus, particular processes, such as the technological mediation of events, exemplified in the work of Claerbout, Viola and Graham, can be thought to produce their own type of time.

From here I propose that, when the process of interaction is introduced into the aesthetic event, time is both *produced* by digital *re*-presentations and also *encountered* in interaction. As a user comes into contact with a database of information, they encounter a particular type of time. In this event, the database enacts a temporal aesthetic in the sense that it archives various sections of the past, and then these are made available again for

the user in the present (or for other users in the future). A user is able to navigate through these sections of past, experiencing them simultaneously, or in a nonlinear fashion, or re-sorting them into a temporal order. Motivated by this Whiteheadian approach and by investigating a set of artworks that utilise archives, such as those of the Atlas Group, Armin Linke, George Legrady, Luc Courchesne and Masaki Fujihata, I develop a temporal aesthetic theory that accounts for the multiple modes of temporality immanent to digital interaction.

My understanding of Whitehead's conception of time is modulated by Deleuze's philosophy of the virtual. Enlisting what Steven Shaviro would term Whitehead's "pursuit of univocity" or an object-oriented philosophy, I focus upon the event as a processual encounter. Using the paradigm established by Whitehead's panexperietialism, I view all the digital actants as processes. These processes – software, archiving, visualisation or the physical processes of interaction – all transpire over different scales of time, producing different temporal rhythms. Informed by Whitehead, Deleuze and supplemented by Serres, I thus propose a type of time that is scalar. Here, digital temporality can be seen to yield nonlinear and chaotic temporalities, produced by, and encountered in, interactive events. User-generated occasions are sequential, software occasions are asynchronous, and the temporality of the archive nests within it various levels of the past. The interactive event is the coming together of these occasions – an event in which we encounter multiple scales of the temporal; an event that I will describe as *multi-temporal* in nature.

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IMAGES[*]

INTRODUCTION

The image can no longer be restricted to the level of surface appearance, but must be extended to encompass the entire process by which information is made perceivable.

Mark Hansen, *New Philosophy for New Media,* p. 10

In Jeffrey Shaw's *Web of Life,* an interactive installation that generates 3D abstract and organic images along with archival footage, we see, on first impressions, an artwork that is primarily about space. In particular this work seems to be about the networking of geographic spaces. In *Web of Life* three installation sites are connected via the Internet; one permanently installed at the ZKM Media Museum in Karlsruhe, Germany, and two other satellite installations. In any of these locations a user may scan their palm into the system, the machine then 'reads' the lines of her palm and uses this information to trigger the 3D images that constitute the immersive environment at all the other sites. On a deeper level though, and a level that is more in tune with the actual *experience* of interaction, this work is about time.[1] As the work connects events across various geographic spaces it not only initiates a convergence of space but also, and more interestingly, a convergence of *events* and a convergence of the temporality of these events. Many user and machine events, distributed over time, are implicated in the interactive encounter as the images are not just produced and affected by one set of users in one location, but by various groups of users in multiple locations. As these multiple events are implicated so are the multiple temporalities in which these events take place. The time of one user comes into contact with the time of another, which comes into contact with the time of the software and the time of the network and its transfer rate. This occurs as the event of a user scanning her hand is sensed by the machine and transposed into software and network events, then used along with data gathered from other handprints over time, and translated into visualisation events. Here we can say that every one event of interaction is connected to and implicated in many other events.

This is similar to the concept of process and time that A. N. Whitehead describes throughout his process philosophy, developed throughout the 1920s and 1930s. For

Whitehead, temporality emerges as actual occasions interrelate and exchange information. In other words, time is produced by events.[2] In *Web of Life* the occasion of a user in one location commingles with the occasion of a user in another location, all of which occurs through the network occasions set up by the machine. What is important to the aesthetics of Shaw's work is the ingression of multiple user occasions from multiple sites over time. As such, *Web of Life* is a work that takes into itself multiple temporal events and draws these together in the present. For Whitehead, this would be how the temporality of the work emerges, as the ingression of the past into the present. If we view time in this fashion we cannot substantiate it as a singular line. Rather time becomes thick as it reflects not only the actual events that occur in the present, but also the past events that direct the actualisation of this present.

My understanding of Whitehead's conception of time is modulated by Gilles Deleuze's philosophy of the virtual, a concept that Deleuze uses throughout his work to face questions of time and events. Enlisting what Steven Shaviro would term Whitehead's "pursuit of univocity", I focus upon the event as a processual encounter.[3] In exploring the temporal aesthetics of interaction, the interactive event between a physical and digital system is viewed as a collection of processes. Following Whitehead, I understand these processes – software processes, archiving processes, visualisation processes and the physical processes of interaction – as all transpiring over different scales of time and producing different temporal rhythms. Informed by Whitehead and Deleuze I thus propose a type of time that is scalar. Here, digital temporality can be seen to yield a nonlinear and chaotic type of time, produced by, and encountered in, interactive events. User-generated occasions are sequential, software occasions are asynchronous, and the temporality of the archive nests within it various levels of the past. The interactive event is the coming together of these occasions; an event that I will describe as *multi-temporal* in nature.

Everyone experiences time in some way or another, yet it remains a notoriously difficult concept to define. Fredric Jameson's alienated and Jacques Lacan's schizophrenic subjects experience time as detached moments that fail to form a temporal link with one another.[4]

Albert Einstein's subject in motion experiences time differently to his subject at rest; Henri Bergson's intuitive subject experiences the flow of duration and for Whitehead time manifests itself as the experience of the becoming of actual entities at every moment of duration.[5]

In this thesis I seek to establish a temporal aesthetic theory for digital interactivity. By framing the event with Whitehead's theory of process and directed by Deleuze's philosophy of the virtual, I am able to put forward an understanding of interaction as generative of a particular temporality. Whitehead's and Deleuze's position on temporality resonates powerfully with one another, as for both these thinkers time is a product of process, not a product of the human mind. Both Whitehead and Deleuze importantly position the mind as within reality, as a particular kind of image amongst other images, as emerging from interactions with the environment.[6] I take as a premise that time exists in reality and that it is this existence that prompts consciousness into being. Thus, in this thesis I do not enter into discussions of consciousness; rather, following Whitehead and Deleuze, I focus on the processes that precede and set the condition for experience and the subsequent production of 'digital subjects'; in particular I focus on the interactive relations that form between physical and digital occasions. This highlights the way that a temporal digital aesthetic emerges in our interaction with things such as the Internet, the archive of the database and the particular programming language and software processes enacted by various digital systems.

The time that I discuss here is not time as it is measured, instead focusing my attention on the event of digital temporality. This distinction is important. Clock time in fact is one technological engagement with time.[7] It is, at its most basic, a linear measurement of time. In this thesis I am not interested in this type of time, instead focusing on time as described by philosophers such as Whitehead and Deleuze, and the way that this can be used to propose a digital temporality. In the following discussion I also look at technological engagements with natural events, but I am not interested in measurement, instead focussing on the way digital processes and relationships may produce new

concepts of time and the way that this type of time is encountered through digital aesthetics and the process of interaction.

As Michel Serres states, "time is paradoxical; it folds or twists; it is as various as the dance of flames in a brazier – here interrupted, there vertical, mobile and unexpected."[8] For Serres, similar to Whitehead, every moment in history is not a compartmentalised section of present, holding a position on a timeline or calendar. Rather, every historical moment draws into itself other events from other periods in history. These periods need not necessarily be proximate in the traditional sense of linear time in order to be thought contemporaneously in Serres' nonlinear time. He states,

> Everyone is amazed that after 1935 the Nazis, in the most scientifically and culturally advanced country, adopted the most archaic behaviour. But we are always simultaneously making gestures that are archaic, modern, and futuristic…every historical era is likewise multi-temporal, simultaneously drawing from the obsolete, the contemporary and the futuristic. An object, a circumstance, is thus polychronic, multi-temporal and reveals a time that is gathered together, with multiple pleats.[9]

The technological engagements with temporal events, seen in particular in the archiving function of the database, may be seen to manifest just this gathering together of time. The database draws together various events, drawing together Serres' multiple pleats, making once disparate occasions proximate and generating relations across varying sections of time. As the database brings together, or nests, a complex of occasions a temporality is enacted by the database that is nonlinear and multiple.

This concept will be unfolded in Chapter 6 but it can be first introduced here by examining Graham Weinbren's *Frames* (1999) (fig. 1-2), a work which uses a database to archive historical photographs as well as contemporary video performances and embodies the concept of drawing together multiple temporalities. In this work, Weinbren appropriates Hugh Diamond's historical photographs of mental asylum patients, taken in the 1840s–1850s. Diamond and his colleague John Connolly used these photographs to evaluate various mental illnesses based solely upon the patient's visual characteristics, seeing the photograph as a *true* reproduction of reality.[10] In this sense the two saw

themselves inventing a new diagnostic tool for the field via the technique of photography. In Weinbren's work a participant stands in front of three large projection screens, two of which are seen through gilded picture frames hanging from the ceiling. Infrared beams are mounted inside these frames, which enable the action of a participant pointing through the frame to be detected by a computer.[11] Standing in front of any of the screens the participant sees one of Diamond's 19th century photographs. If the participant points at the projection, putting her arm through the frame and motioning in just the right way, it triggers a voice over taken from an original text that provides the psychiatric description of the patient. If the participant further motions through the frame she triggers a video of a contemporary actor preparing to imitate the poses of the 19th century patient. If another movement is made the participant triggers another voice over, this time a director giving instructions to the actor.

Figure 1.

Figure 2.

Graham Weinbren *Frames* (details), 1999

In terms of a temporal aesthetic, in this work we see multiple occasions collected together in the work's database. Diamond's photographs, the young actors and the two different voice-overs act as the source materials collected from different times, and suggesting different temporalities. The original photograph embodies a historical event of pastness, which morphs into the presentness of the young actor performing the photograph and the self-reflexive comments of the director that direct the future actions of the actor. The database draws these occasions together in a new relational context and opens this for navigation by a user. The past photograph becomes the present, initially shaped in its composition by the external influence of the director and then later by the interactive

movements of a user. Here we see the database as more than a system associated with the capture and organisation of information. We see that it is culturally and, importantly for this argument, temporally significant, as it archives past occasions so that they may be re-actualised and re-contextualised in the present.

The temporality of interaction is also important here as, in order to transform the mental patient into the contemporary actor, the participant must regulate her gestures through the frame to a precise temporal rhythm; if she moves too fast or too slowly the images cascade erratically, the pastness of the photograph does not become the presentness of the actor, rather the past repeats, unable to progress, finally resulting only in the image of a dark staircase, perhaps a metaphor for the internalities of the patient, leading the viewer nowhere. If the participant does find the 'rhythm' of the piece however, she transforms the image of the mental patient into the moving image of the actor, who now moves into the centre screen, looks out a window or into a mirror, or interacts with any other fully formed actors that populate this space.[12] If the participant is able to move in the correct tempo, if they are able to tap into the work's 'rhythm', she is able to transform the historical past of the photographs into the present of the actors, if she fails to find this temporal 'rhythm' then the work becomes a repetition of the past, failing to link together in the present.

For Whitehead, this process would amount to a continuation of the past into the present. As the photograph is shaped into the image of the actor, a past occasion is shaped into a present one, which would for Whitehead be explained as the present grasping information from the past. In Whitehead's terms past actual occasions accumulate in what he terms an 'extensive continuum', a field in which the past resides in order to pass information to the present occasion. As the participant gestures through the gilded frames, she draws upon past occasions, drawing them forth from an extensive continuum, in this case a database, and activating them in the interacting present. These past occasions direct the present; they provide the conditioning for the present's becoming by providing the images and audio that the user re-assembles in the present.

We could see similarities here between the database of interactive art and the cinema of the recollection-image.[13] However, the difference between cinema's images of the past and the images of the past of the database is that the former re-presents the past in a static way, enabling a viewer to re-think or re-experience the past in a new cinematic time and context. In contrast, interactive art does not just facilitate a re-thinking of the past but rather an actual re-living of the past in a dynamic way; it is not so much a past that is seen but rather a pastness that is re-lived as it is physically triggered by the user's actions. The past is not just re-thought here in the terms of a cinematic time and space, but in the terms of an interacting time and space, shared by both the content and the participant. As the user encounters a database as an extensive continuum, they are able to re-assembles past information in order to simultaneously shape the aesthetics of the present and to experience its consequences in the present. As such, the past is brought into contact with the present, as the user is responsible for performing the aesthetics of the work, for re-shaping the past by the act of re-shaping the image of the mental patient.

The work is ultimately centred on the relationship between a photographer and the subject, and it is specifically concerned with the ways that technological mediations may in fact *produce* the subject. For instance, Diamond's photographs were meant to capture a particular truth about his subject, gaining an insight into the asylum patient's true character. However, Diamond's photographs reveal themselves as extremely posed. It appears that Diamond himself has instructed the participants to sit, fold their arms, look at the camera, manipulating his subject and thus manipulating the photograph and his findings. The interactivity of this work mirrors this process, with the participant having the power to 'shape' the image. The participant 'shapes' the figure by gesturing through the frame, by testing out gestures and finding the correct manner in which to manipulate the images, just as Diamond had to find the correct manner in which to manipulate his subjects.

In a Whiteheadian sense, process here gives form and substance to the aesthetic content of the work. The process of Diamond posing his subjects in what seem painfully unnatural guises, the process of early photography and the long exposure times that

necessitates that the subjects 'hold' their pose, the processes of the 20th century actors guided by the director's voice and the final process of interaction with a database, shape the content of this work. Here, for Diamond there is no subject to be studied, just as for the participant there is no aesthetic to be known from the outside. Instead, we see in this work an emphasis on the way that observation is never from an outside, but rather an act that is itself involved in that which it tries to observe. Diamond's original photographs are not of a subject per se, but rather of a subject affected by the processes of photography. Likewise, aesthetics here do not involve a set of images in a cinematic sense, but are rather a set of images affected by the temporality of the database and the 'rhythm' of interaction.

The notion of *re*-presentation through a technological mediation, as seen above in *Frames,* will be fleshed out throughout the thesis. However, I want to invoke the term 'mediation' outside of its traditional use in media studies. The concept of mediation usually involves thinking of a transferral of information between two objects, recently understood as a transferral between media channels. The traditional idea is that there are two pre-existent entities or media, and that mediation takes place as information that moves between these poles. For instance, John T. Caldwell has cited the mediation that occurs between television and the Internet, creating a new medium in which the two media work together.[14] In this example the new medium of the Internet works on top of the old medium of television, overlaying the old by allowing 'users' to take on a more productive or interactive role. However, when we think of this process via Whitehead and Deleuze the idea of pre-constituted and discrete media channels that work on one another completely falls down. This is because this approach would privilege the *substance* of media, rather than the *processes* of mediation. For these thinkers it would be the mediation, as a process, or a relation, that provides the conditioning for the media to take form. Thus following Whitehead and Deleuze, mediation, as a process that draws media into an ecology, would direct the becoming of the singular media in that ecology. I am not interested in the idea of the Internet, as a discrete new medium, that mediates television, as a discrete old medium. Rather, media are never that stable, they are always conditioned and thus constituted by their associated milieus. When they are drawn

together by the process of mediation, they are drawn together in a new milieu, drawn into a new context, that conditions these media occasions.

As Jay David Bolter and Richard Grusin have pointed out, mediation – for them a re-mediation that, as above, occurs between old and new media, albeit in a more ongoing way – is a process that forms a network between that which it mediates.[15] Within this network new forms of the old media emerge, directed by this new cultural context. My argument, moving on from Bolter and Grusin's, is that new media itself does not cause a re-reading of old media, or a re-reading of the history of that media, but rather it is the process of mediation, as a flux between media and also media content, as a process that forms ecologies, that causes this re-conditioning. For instance, television is not a permanent entity or definable thing. It is *historically* and also *ecologically* contingent. For instance television in the 1970s involved a set of technical, programmatic and social contexts. The becoming of 1970s television involved things such as the conversion of TV stations to full time colour transmission, mass nationalised audiences, long running nightly soap operas and advertisers relying on a codified ratings system. In contrast, 2000s television has become significantly bifuricated from this type of functioning and reception. Television now involves phenomena such as cable television, with its large number of channels and choice of programming, hard disc recorders such as TiVo that facilitate live rewind/fast forward to 'eliminate' advertising, a mass of reality-based game shows, with content that is linked to Internet websites, as television constantly rearranges itself in relation to computer usage. It is not that television has evolved or developed into its present form as a result of its own internal forces. Rather, television's becoming has been directed by media ecologies, in particular the networks associated with the Internet, in which it now must compete. As such it is contingent on the way that it is mediated and the networks that it finds itself within.

Media content, such as the photographs or the video footage from Weinbren's *Frames* is also contingent upon the way that it is mediated, emphasising the concept of mediation as a process central to the aesthetic event, and the more localised network that it finds itself within. Mediation is not a flow between two pre-existent entities, rather it is a process

that re-presents or re-constitutes entities. In short, it is a generative process, setting the conditions for the becomings of entities. This is a temporal process, with technological processes generating particular conditions for becoming.

The notion of mediation is important to me as in this thesis I work with the idea that time may be mediated by digital systems. This is not to say that time is somehow a pre-existent substance that is captured from outside digital media and mediated to become part of digital information. This view would be all too dependent on substantialising temporal occasions. Rather the argument is that mediation, as a process, provides a set of conditions for temporality and generates a certain type of time. If we follow Whitehead and think of occasions and processes as producing temporality then we see that it is the process of systems that produces the time of these systems. For instance, in terms of the above examples of 1970s and 2000s television, the ecology produces the temporality of the television experience. 1970s television involves a mass audience, collected together at the same time in front of the cathode ray television set. In contrast, 2000s television involves a different temporality by providing a different style of viewing, a shift from a broadcast network approach to an approach that gives the viewer greater control over content. 2000s television, seen in Reality TV shows such as *Big Brother,* provides links to the Internet, allowing viewers to access supplementary material at their leisure that is not broadcast and to participate in fan culture websites. In addition, developments such as the already mentioned hard disc recorders such as TiVo allow time shifting, enabling viewers to choose the time and the sequence in which content is watched.[16] The differences in temporality here involve the difference between a system that presents occasions as a sequence of events to a collective audience and a system that presents events that may be participated in and re-sequenced by viewers over time.

In terms of *Frames* we can also see that a digital temporality is produced by the act of mediation: an act that draws together multiple episodes of time in the work's database. Mediation here, seen in particular in the digitisation of Diamond's original 19th century photographs and their overlay with the 20th century video footage of actors, generates a particular type of time, a time that is doubled between past and present. As the original

photographs are mediated, they are re-presented through the digital. Mediation here is a process in which the past is brought into the present. The photographs from the past communicate with the video footage from the present, exchanging information and each contributing to the experience of the other. This new context for Diamond's photographs, realised through digital mediation, sees the photographs contribute to the video footage, just as the video footage contributes to the photographs. The images of the actors and the voice over of the director with reference to Diamond's original photographs indicates the power relationship between the director – or the photographer – and his subject and the way that this shapes the substance or subject of the photograph. As we cause the photograph to morph into the 20th century performance, which itself is shaped by the director's comments, the notion of performance becomes central to the aesthetics of the work. Firstly, the original photograph is performed by the subject, as she is twisted into poses by Diamond, secondly the video is performed on two levels, firstly by the actors and also by the director as he verbally shapes their poses, and thirdly the participant performs the work, as it is directed by her movements sensed through the frames. We can say that the technological mediations at play here, mediations to do with the capture and re-presentation of a 'subject', are themselves performative and it is this process that actually constitutes what we think of as the 'subject'.

Relating to the notion of technological mediations, the developments of vast networks, data transfer rates and the ubiquity of computing have changed the way that the majority of us experience time. Poststructuralist philosophers such as David Harvey and Jean Baudrillard have told us that we are experiencing the end of time through a gradual compression of time and anamorphosis of speed, which produces an eternal present that swallows our temporal experiences.[17] What I propose is that it is not that time is engulfed by the black holes that emerge as speed and technology reach a critical limit, rather it is that what constitutes temporality changes as new processes emerge. At these points time enfolds upon itself, it becomes thick with nonlinear events. This nonlinearity does not signal the end of the concept of time, simply because time is not necessarily linear. Rather the nonlinearity of digital systems may give rise to a nonlinear *experience* of time. In this thesis I will argue that our relation with the digital is a relation across various

scales of the temporal. The digital encounter is an event in which multifarious occasions, both human and machinic, are affected by their temporalisation. These occasions are connected *in* time; they form an ecology in which occasions, such as information processing, human-machine interactions, affect, memory and the interface, extend over one another in time.

If we are to think of the digital in terms of time we need to overcome the tendency to spatialise the process of interaction with digital systems. It is quite common to associate interaction with ideas about space; we need only look at popular idioms associated with the digital. For instance, when we access the Internet we are told that we enter a 'cyberspace', in which we visit web 'sites', and when we communicate over this network we are said to initiate a convergence of once separate spaces. We imagine ourselves existing in a network of interconnected nodes, having the capability to be in two places at once. We can also see this in examples of offline interaction. For instance, Oliver Grau describes interaction as a placing of the spectator in the image space of illusion, so that the image and the spectator exist in the same immersive space.[18] In addition, Lev Manovich has developed a database aesthetics in which the way that we understand a database, as a field of relations set out in the space of the database, contributes to the way that we experience both aesthetics and daily life.[19] These are the spatial concepts and metaphors that dominate our understanding of interaction. I propose a different view of digital media, one that is able to associate the digital with the temporal, and, by extension, to grapple with the meshes and interconnections formed by events *in* time, not merely *in* space. By viewing the digital encounter as a temporal event, I situate this in the realm of the Deleuzian and Whiteheadian event; a realm in which virtualities, becomings, extension and process in general, constitute all experience and material existence.

I use Whitehead and Deleuze because it is precisely the temporal character of reality that dominates their philosophy. In Whitehead, as with Deleuze, there are not *things* made but rather, as Bergson puts it, *things in the making*.[20] It is the process of entities, not their substantiality, which constitutes their existence. This type of thinking is particularly apt for digital aesthetics. As Andreas Broeckmann points out, the unstable image of the

digital is articulated to process. The digital image, whether static or in motion, is the result of continuous and ongoing computations.[21] The digital image itself is an unstable stream of code, never attaining existence without the constant flux of information over time. In addition to these computational processes that occur behind the interface, the aesthetics of interactive media art are constituted largely by other non-visual characteristics such as narrativity and interactivity. Whitehead's process philosophy is particularly suited to elucidate these non-visual processes that give the digital interactive event its character. In the digital encounter, as for Whitehead's view of the entire universe, there only exist things in the making that are the direct outcome of a flux of events.

One of the only times that Whitehead is overtly mentioned in any significant way in Deleuze's work is in *The Fold: Leibniz and the Baroque*.[22] In the chapter titled "What is an Event?" Deleuze cites Whitehead as the philosopher of the event, and constructs a commentary that illuminates the concept of the event that runs throughout his entire body of work.[23] The digital interactive event, a concept that I will begin to investigate in Chapter 2, when thought through Whitehead and Deleuze, can be understood as a collection of processes, some of which are generated by a 'user' and some generated by a technological system. By placing emphasis on process rather than pre-formed substances and when investigating digital interaction through Deleuze and Whitehead, interactive events cannot be reduced to ideas of a subject or 'user' using a technological system. Instead the interactive event is to be understood as a process of interaction in its fullest sense, as an *interpenetration* of a human with technology. By doing so, rather than a 'user' using a machine, I would like to think of the digital event as a common operation between user initiated occasions and machine initiated occasions. For example, in both Shaw's *Web of Life* and Weinbren's *Frames* the 'user' does not merely impose her actions and intentions onto a machine in order to generate a specific output. Rather in both works the machine senses user-initiated processes, be this a hand placed on a scanner or the movement of an arm sensed by lasers, and transcodes this into digital information. The machine then uses this to initiate a set of processes that actuate an image upon a projection screen. The 'user' must work within the machine's rules in order to actuate

content, as seen in *Frames* as the 'user' needs to find the right 'rhythm' or 'tempo' for interaction. In a similar sense, the machine works within the conditions set by the 'user' initiated activities; the machine unfolds its processes directed by the digital information that it garners from the physical processes that it senses from the 'user'. The machine and the 'user' work together, as a collective, both setting conditions on what the other can achieve. As such, both user processes and machine processes set a conditioning, as a set of *virtual* information, which directs the interactive event.

Before moving on it is important to understand that the term 'virtual' that comes from Deleuze has little to do with the supposed 'virtual' realm of the Internet, the database or the digital. Anything digital has often been described as virtual, for example 'Virtual Reality' (VR) or the 'virtual spaces' of the Internet. In 1938 the poet and playwright Antonin Artaud first used the term 'virtual reality' to describe the reality of the theatre.[24] This term then made its way into the vernacular of new media via the computer scientist and VR pioneer Jaron Lanier.[25] The term has now been adopted to describe anything behind the interface that is not directly accessible to the user's senses. In order to develop a theory of time and events directed by Deleuze's understanding of the virtual we must take issue with the idea of virtuality still dominant in computational discussions. The virtual that Deleuze speaks of is not tied up with notions of the 'virtual space' of the Internet. It is more inline with the virtual that Marcel Proust speaks of, as "real without being actual, ideal without being abstract."[26] As DeLanda points out, the virtual "does not refer, of course, to the virtual reality which digital simulation have made so familiar, but to a *real virtuality* (DeLanda's emphasis) forming a vital component of the objective world."[27] The virtual is not the sphere of the digital; it is rather a condition that provides the potential for experience. As Shaviro explains it, "the virtual is like a field of energies that have not yet been expended, or a reservoir of potentialities that have not yet been tapped."[28] The virtual is the impelling force that allows actual entities to manifest themselves; it is a conditioning that allows the production of something new or novel.[29] It will be seen in Chapter 4 that the virtual can be brought to bear on interactivity in order to better understand the conditioning for the interactive event. The virtual in respect to

interactive art is a field of conditions, imposed by both the internal programming and limitations of the computer as well as the processes initiated by a human user.

If we introduce the temporal dimension into a discussion of digital aesthetics, we may uncover the emergent and differentiated temporalities that are opened in the digital encounter. For instance, as a database organises a collection of disparate temporal information its structure moves from uni-temporal to multi-temporal; each datum being immanent to its own scale of the temporal. When presented in an archive this data element or datum amplifies or dilates the viewing or interacting present so as to include these multiple scales. Also, multi-temporality is felt in the digital encounter as the time of software processes come into contact with the physical processes of a user. This concept of multi-temporality when applied to the digital refers to the multiple layers of duration that come into being when we interact with digital systems. I borrow the term 'multi-temporal' from Neil C.M Brown et al's paper "Interactive Narrative as Multi-Temporal Agency."[30] In the context of this paper, written to accompany the exhibition of the immersive work *T_Visionarium* (2008), multi-temporal refers to the multiple temporalities represented by moving images from different historical periods, stored in the work's database and visualised together upon a screen. *T_Visionarium* is an immersive and interactive work that, via a 360-degree projection screen, surrounds the participants with a multitude of stereoscopic video clips, taken from Australian television. Using a hand held interface, the user can re-assemble these clips, causing the clips to fly through the 3D and 360-degree space of the installation. Multi-temporality occurs here as images that originally transpired in different sections of time are presented together and simultaneously experienced in the present. In this mode of presentation, multiple sections of duration are available to the participant in the viewing present. I want to further this definition by using the term to also describe the multiple scales of the temporal that co-exist as the multiple actual occasions of the digital encounter commingle. These actual occasions involve technological occasions, such as the occasions of the software, the occasions of the database, including the processuality of the particular programming language, the particular organisational structure and the database management system, and the occasions of the hardware as well as the occasions

sensed from the interacting 'user'. By doing this I focus upon the way that the aesthetics of interaction are performed as a common operation between a technological system, aesthetic content and an interacting 'user', focussing on what could be termed a techno-aesthetic process. All of these processes transpire through various lengths of duration, which are all nested within one another in a field of multi-temporality.

The concept of multi-temporality has been used in various fields of study. There is multi-temporal music, which is the composition of sound streams that have different internal tempos. Conlon Nancarrow and György Ligeti are pioneers of this type of music, in which two parts of the same score are played at different speeds. Edwin Gordon describes this, stating "when only one tempo is used throughout an entire piece of music in usual meter, that music is called uni-temporal, and when two or more tempos are used in a piece of music in usual meter, that music is called multi-temporal." The affect of this is a score that is discordant in time, that moves from tempo to tempo in a jarring fashion, modulating the beats in rhythm patterns. These pieces may either speed up or slow down at any moment, time shifting from microbeat to microbeat or may overlay one sound source in one tempo with another sound source in a different tempo.[31] We can transpose this thinking to the database structure of the digital and the interactivity of the digital encounter. The occasions of the digital contain multiple temporal rhythms as the time of the user meshes with the time of the machine, the time of the software, the time of the network and the time of other users. Multiple temporal rhythms are also present in the database as the occasions from various temporal neighbourhoods are put into proximity and organised in a collection of multi-temporal information.

The term multi-temporal has also been used in the field of photography and image analysis. Most commonly this relates to satellite imagery that captures information from various moments in time, being in essence an assemblage of information from various points in time. A multi-temporal image is thus a composite made over time; the image is an assemblage of multi-temporal information presented simultaneously. Below is an example from the Canada Centre for Remote Sensing (fig. 3), a composite of satellite imagery of the Mackenzie Delta, Canada from June 1 and June 8, 1997. Areas which

have not changed between the dates appear as white and black, the cyan areas indicate ice covered areas on June 1 that were ice-free on June 8.[32]

AN IMAGE HAS BEEN REMOVED DUE TO COPYIGHT RESTRICTIONS

Figure 3.
Canada Centre for Remote Sensing, Multi-temporal Image of Middle Channel, June 1 and June 8, 1997
(image from http://cct.rncan.gc.ca/resource/tour/26/26scene2_e.php)

The database presents us with information in a similar fashion. Through the archiving of temporally diverse information, the database is able to represent and generate relationships. The difference though is that when this information is presented it is not solely visual, it is not static and it is not solely spatial. The database presents its information *in* time; it is open to the navigation of the user *in* time. Thus, in the multi-temporality of the database, the time of the events of interaction mesh with the hierarchical or relational time of the database, depending on its mode of programming. This is the process which brings about a thickening of the duration of interaction.

In order to understand this concept of a thickening duration we first must understand what is meant by the term 'duration.' This is the purpose of Chapter 2, in which I set the theoretical framework for a temporal aesthetic by investigating Whitehead's time and Deleuze's time, both of which are informed to varying degrees by each thinker's reading of Bergson's time. A duration is defined, following Whitehead's reading of Bergson, as our observational present, importantly though, this is a mobile present, that is both continuously moving into a future beyond itself and also retaining the past that it itself is beyond. This presentness of a duration is a state in which the present dilates both into a

future and into a past. In Bergson's duration there do not exist events that begin and end but rather, as Bergson states, "…a continuity of flow…a succession of states each one of which announces what follows and contains what precedes."[33] A duration thus does not have a definite start and end point, it is rather a mobility that arises from the flow of events, each of which extend over one another. For Whitehead this type of duration takes form as a complex of actual occasions constituted by the flux of nature. This type of event has jagged boundaries in that it extends over, or includes, other events. A duration, as Whitehead states, is a peculiar type of event that, while extending over other durations, obtains in itself a certain completeness. Through this concept of a duration, Whitehead aligns his philosophy with Bergson's. In the preface to *Process and Reality* Whitehead acknowledges a debt to Bergson's concept of durations and experience in a temporal regime. This is reiterated in the way that Whitehead conceptualises events.[34] Also, in *The Concepts of Nature* Whitehead points out that the way in which his philosophy frames time, or what he describes as the "passage of nature", is in full accord with Bergson's time, as a flow of time that cannot be grasped from the outside, but rather can only be intuitively experienced.[35]

The connection between Whitehead and Bergson is clear, as Whitehead outrightly acknowledges Bergson's influence on his contemporaneous philosophy. There is also a clear connection between Deleuze and Bergson, made clear in Deleuze's book *Bergsonism.* This is again clearly seen in Deleuze's philosophy of the virtual, running through texts such as *Difference and Repetition, Cinema 1* and *2, The Fold: Leibniz and the Baroque* and *A Thousand Plateaus: Capitalism and Schizophrenia,* which is based largely upon his adaptation of Bergsonian concepts. But the connection between Deleuze and Whitehead, however important, is less straightforward.[36] Although Deleuze makes no regular reference to Whitehead, a valuable theoretical framework may emerge by allowing Whiteheadian and Deleuzian concepts to 'cross-pollinate'. As James Williams points out, there is not a Deleuze's Whitehead in the same sense that there is a Deleuze's Hume or Deleuze's Nietzsche or Deleuze's Bergson.[37] However, there is a link between the two thinkers, firstly provided by their common adaptation of Bergson and

subsequently by the way that both these thinkers frame their philosophy around the already mentioned concept of the event.[38]

As we encounter the digital we work in a co-operative relationship with the machine of the digital as well as the technics, or the modes of operation, associated with the machine. Accordingly, we become connected to the time and space of the digital. This connection to space has been theorised in many places, but the connection to the time of the digital has been neglected. In the digital encounter we are now asked to interact in a duration comprised of everyday time, process and events and to also interact in the digital duration; a duration of multi-temporal events, asynchronous information processing and the flux of code. This type of time is thick with the information of the archive of the database, the asynchronous time of the code and the digital images associated with these events. In general, the multi-temporality of the digital presents an alteration to the way in which we experience the occasions and events of our everyday lives. In other words, the different modes of organising information and constructing meaning afforded by the organisational and generative processes of the digital may provide us with opportunities to experience life differently; to experience life and aesthetics as a set of processes supplemented by technological mediations.

Orit Halpern cites Norbert Wiener, mathematician and founder of cybernetics, as the figure who marks a shift from a society of exploration to a society of organisation.[39] In his book *Ex-Prodigy,* Wiener points to a state of being in which there is no longer an emphasis on the discovery and documentation of information. Rather, for Wiener, emphasis is put on organising already known information. This marks a turn away from recording the external or natural world to an obsession with processing the established traces of memory. From these new organisational structures one is able to deduce patterns and to generate a "flow of ideas."[40] For Halpern and Wiener this flow is generated ideationally. However for me it is the process of interaction and the relational structures that are generative, not consciousness per se. This can be particularly seen in recent developments in data mining frameworks. For instance, when encountering a database such as the recently developed Nora or MONK, databases set up to allow the data mining

of literary texts, a user is able to 'ask' the system a question.[41] For instance, a researcher could search for the occurrences of erotic language in Emily Dickinson's poetry. The system then searches through its collection and indicates these patterns. The system thus provides the potential for insights and new knowledge based on its organisational structure and programming language. Here we can see that it is not the user nor the computer system alone that generates insights, rather it is the *process of interaction* that uncovers these patterns immanent to the data and sets the condition for knowledge to emerge: both query and search must be put into process with each other.[42] Seen here, it is not that technology *determines* our thoughts or experiences, but that it rather provides a *condition* for these thoughts or experiences to emerge.

The relational structure between humans and technology is thus constitutive of the becoming of knowledge, ideas, subjects and users. The particular structure – in this case the database – prompts a certain type of experience and a certain way of thinking; the patterns that it generates directs our modes of thought and further inquiry. Importantly, it is not the database alone that causes this knowledge, rather it is the database that provides *potential* that is able to be actualised by a user through the process of interaction. Thus the *process* of interacting with particular organisational structures provides the conditioning for a certain way of thinking; the patterns that are generated by interaction direct our modes of thought. As already stated, I shall not here, nor anywhere else in this thesis, enter into any discussion of consciousness or the psychology of a viewer. This is simply because it is beside the point of a Whiteheadian and Deleuzian framework to consider it as a determining entity. When enacting the insights of these thinkers, the processes of systems, organisational structures, affects and the relationality of entities are important, not consciousness, which for Whitehead, is merely an outcome of these processes. In other words, it is the process of occasions that is important; mentality or consciousness is just an outcome of process.[43]

The research in this thesis is driven by a concern with temporal aesthetics, a concept that has been brought into question previously, most famously in the 1960s. As Pam Lee points out in *Chronophobia,* the relationship formed in the 1960s between art and

technology, a necessarily temporalising relationship, brought questions of time into a relationship with questions of aesthetics. Time became indivisible from the process of mediation and performance.[44] Lee points out that art's eternal state of timelessness, championed by Michael Fried, becomes compromised as the acceleration and speed afforded by technology permeated through the artworld.[45] Following Jack Burnham's system aesthetics, artists in the experimental cinema and performance paradigms of the 1960s, such as Peter Weibel, Valie Export and Stan Brakhage began experimenting with art that was becoming open and transactional. Burnham, informed by the theory of systems perspectives, proposes an aesthetics in which everything reacts on everything else.[46] As he points out, this systems orientated approach is less about *things* and instead focuses on events, or *things becoming,* much like Brakhage's experimental film *Mothlight,* in which he sprinkles dead moths, grass and seeds directly onto film stock. The artwork here is less about the final film and more about the compositional processes that set the condition for the film to come into being.

In this thesis I carry this historical drift through to artists experimenting with the interactive function of media. Throughout the following pages I cite various examples of media art, from various sections of its history. I do not attempt here to form a historical timeline of media, tracing the development of the temporal experiments in media in a sequential fashion. Instead, to be more in line with the tenets of this thesis, I present works from varying periods simultaneously, allowing elements of one work to influence the analysis of another. I try to present time, in a similar way to Serres, as a complex of events that all extend over one another, regardless of their place on an imagined timeline of history. The analysis thus does not follow a linear chronology. Rather, following the larger Whiteheadian and Deleuzian framework worked up here, I view each present moment as made complex by the continuation of the past in the present. Thus, in my approach to media history, I view every occasion of present as forming a connection with various moments of the past – both local and distant. In this methodology, a contemporary work can be put in connection with an artwork from 1980, as this section of past is carried forward into the present. This methodology resists the reductive analysis of the historical timeline and instead takes a more *archaeological* view of history,

approaching it as a nesting of occasions, which, as a result of my analysis, form lines of relations with one another.

In Chapter 1 of this thesis, the first part of the literature review, I explain the theoretical problem that the reliance on metaphors of space common to new media theory poses to the field. I then locate the major proponents of this methodology and trace possible lineages of this mode of thought. It must be kept in mind when reading this chapter that it is not that I dismiss any theory that enlists spatial thinking. On the contrary, I readily accept the significant theory that has emerged from a spatialist methodology. However, the problem with purely spatial theories, as are dominating the theoretical discourse of media art, is that the temporal is neglected.

In Chapter 2, the second part of the literature review, I set the theoretical framework for my investigations. As already mentioned, there are two major philosophical groundings to this research that intersect throughout the thesis. These are firstly Whitehead's process philosophy and secondly Deleuze's work regarding time and the virtual, including his reading of Bergson. Firstly, I explain the central concepts of Whitehead's process philosophy, paying particular attention to the way his theory of actual entities and events relates to interactive media art. Secondly, I investigate the temporal concepts that Deleuze builds from his adaptation of Bergson. I then add to this discussion of nonlinearity by building upon Serres' concept of presentness as a turbulence of temporal flows. These different temporal concepts, allowed to interrelate, are brought to bear on the digital encounter in order that I may develop the concept of the multi-temporality of media art.

In Chapter 3, I analyse artworks by David Claerbout, Bill Viola, and Dan Graham in order to show how video and installation art has been used to experiment with time. These artists alter perceptions of time as a singular linear series, presenting it instead in the form of loops, extreme slow motion and the juxtaposition of multiple temporal images. This discussion sets the foundation for the coming chapters in which I build up to a theorisation of digital artists that are altering time in a nonlinear sense, using interactive

technologies. Viewing Claerbout's, Viola's and Graham's work, I attempt to conceptualise the way in which these artists, by utilising the particular modes of operation embedded in different media, enact processes that actualise new experiences of time.

In Chapter 4 I provide an exploration of the virtual, illustrating the operation of the virtual in several examples of time-based media art, and indicate the significance and relevance of this concept to a time-based aesthetic theory. I introduce in this chapter a concept that I term the condition of 'userness'. This concept allows me to posit interaction, after Whitehead's process philosophy, as a succession of occasions, each of which prehend the other. By this I focus on processes and relationships rather than on an individual user. In this chapter I argue that interaction be thought of as a Whiteheadian event in time, which illustrates the ecology of human and machine within this encounter.

Following on from this, in Chapter 5 I investigate the way that we can begin to think about the space of interaction, outside of the metaphors criticised in Chapter 2, in relation to time and process. Here using several examples of interactive digital art, I examine the connections between digital and physical processes and the type of interaction spaces in which these processes play out. The argument of this chapter is that every occasion within the interactive system forms an ecology or milieu that produces the space in which the ecology plays out. In a sense, processes *perform* the space in which they play out. This argument stands in opposition to a concept of 'cyberspace' or the space of the digital as an embedding 'other' space in which events, both material and immaterial, simply occur. Instead I propose in this chapter a type of space that is tied to the passage of interactions. The process of becoming digital space is directed by the actual occasions that are necessarily connected to the space in which they play out. These occasions, both physical and digital, simultaneously enter into a process of unfolding in space while also producing the space in which they unfold. The classic example of this is interaction with VR in which the user moves in both physical and digital space, linked to the machine, in order to produce the environment in which she then interacts, with often new physical gestures unfolding in this space.

The temporality of interaction is furthered in Chapter 6 as I propose a re-examination of archive and database art through the temporal framework that has been established in the earlier chapters. In this chapter I position the database and its associated aesthetics *in* time by applying Whitehead's process philosophy, specifically his theory of actual entities. Viewing the database through this framework I develop a theory that highlights its temporal character, drawing together past events and carrying them into the present. Here the concept of multi-temporality is deployed in order to propose the time of the encounter with a database as a thickening duration in which multiple scales of the temporal exist. It is this co-existence of differentiated temporalities that inflates the viewing present and this is precisely how the digital encounter may alter our experience of time. In this chapter we see the time of the database as a complex of multi-temporal occasions, a multitude of various temporal events all enfolded in the archive. The viewing and interacting present becomes thick with different episodes of temporality, as these are unfolded at each moment of the interactive event.

This chapter thus proposes a different approach to understanding database and archive art outside of the already established conception of database aesthetics. Since Manovich's work on database aesthetics in the late 1990s to the early 2000s and the more recent publication of Victoria Vesna's edited book *Database Aesthetics* the term has come to encompass all artworks that involve the organisation of data.[47] In general, the term has come to embody the way that the database can be thought of as a cultural form, as a technology that organises and enacts a 'digitalising' of everyday life. There is an idea implicit in all of this that everyday life exists as an outside of the database, as something that the media grasps and re-configures, in a similar vein to the traditional usage of mediation. In a sense, database aesthetics pictures real world events, as pre-existent objects to be re-organised by the database. I want to re-assess this idea through Whitehead and Deleuze, and understand database aesthetics differently. I understand the temporality of database aesthetics as a system that may re-present the past; a system that may make the past present again. But not in the sense of an object that is merely re-configured by a technological process. Here I do not picture the past as an outside to be grasped by the database and organised. Rather I view the database as a process.

Importantly this is a process that not only changes the information that it archives but is also generative of a particular type of presentness in which the information is accessed. This is a process bringing together pastness and presentness; a process that does not sit outside or beyond everyday life, but rather a system that is involved in a process *with* everyday life; a system that is necessarily temporal.

Building upon this in Chapter 7 I apply the theoretical framework established in the preceding chapters to Del Favero, Brown, Shaw, McGinity and Weibel's *T_Visionarium.* After having developed Deleuze and Whitehead's theories into a mode of thought that is able to grapple with the temporality of interactive media art and having also argued for the temporality of the database structure, in Chapter 7 I work this theory through a major case study of interactive media art. I also apply these modes of thought to other case studies in order to indicate the applicability of this theoretical approach across a range of examples of media art.

Throughout this thesis it will be seen that the interactive aesthetics of media art are tied to concepts of time and the event. In this event the aesthetic occurs immediately, as the process of interaction is performed in the present. However, this event also includes in itself an element of pastness, through both the user's reflection on past interactive performances and also the archiving function of the database. The aesthetic event *is* this state of presentness and pastness; a state in which processes of composition and reception are continually in flux. We do not see in the digital encounter an object as a mere welter of data.[48] Instead, in this event the user simultaneously experiences varying scales of the temporal as she connects to the digitality of the machine and at the same time draws upon her interactive experience.[49] She both performs the act of interaction and deploys the outcome of her past interactive performances, attempting to *perform* the present and *understand* the past simultaneously.

CHAPTER 1

Problems of Space without Time

When you think of space alone, or of time alone, you are dealing in abstractions, namely, you are leaving out an essential element in the life of nature as known to you in the experience of your senses.

Alfred North Whitehead, *The Concept of Nature,* p. 168

My purpose in the literature review set out over the next two chapters is to firstly indicate the possible sources of the spatialisation of the aesthetics of media art and then to move beyond the atemporal logic that currently dominates this discourse. This would provide a means to propose the logic of interactive media as marked by concepts such as time, process and events. This temporal view of the digital encounter is proposed by approaching it in terms of interaction rather than from the point of view of one individual 'subject' or 'user'. By doing this I wish to emphasis the *process* of interaction, which is in contrast to a more traditional art history discourse that is focused on the psychologised subject, or a traditional media and design theory that is focused on a 'user'. In this chapter I will first outline where and how the spatial metaphor is employed as a descriptor of the digital encounter. I will then in the next chapter introduce the theories from which we can begin to build upon in order to think about the digital outside the spatial metaphor and in terms of time.

1.1 The Problem of Space and the Digital

Marlena Corcoran, in her paper "Digital Transformations of Time: The Aesthetics of the Internet", points out that the cultural discussion that surrounds the Internet has been dominated by space.[50] Her paper provides a first step to theorising the digital encounter, outside of the purely spatial metaphor, by thinking of time as a central element in the interaction between humans and machines. Corcoran points out that the emphasis of the digital aesthetics of the Internet should not be upon the image but rather the time-based

actions of visiting the website and the act of downloading. Although Corcoran's paper was published in 1996, its prescriptions have not been widely accepted and, as I will point out in what follows, we have developed concepts around interaction that largely rely on the atemporal logic of database aesthetics and spatial metaphors. When we think through the spatial framework alone we neglect to consider the temporal and temporalising qualities of interaction with digital art and the impact of these interactive processes on the aesthetics of the work.

Since William Gibson's conception of cyberspace presented in his 1984 science-fiction novel *Neuromancer*, the spatial metaphor has constrained the digital encounter outside of time. Also, this metaphor gained ground due to Marshall McLuhan's invention of the sociological concept of media as a 'global village'.[51] Cyberspace or the space of the global village has been thought of as an absolute ahistorical place in which events play out. McLuhan's and Gibson's space is the space of emptiness; it is a container for events and objects that is unaffected by time. It is not a reflective, differential space, but rather a metaphor that positions media and its transmission in a supposedly ontological, but still imaginary space. For instance, Sherry Turkle, in 1997, argued that increasingly people are learning to live in 'virtual worlds' as this space becomes part of the routine of everyday life.[52] Turkle here no longer uses space as a metaphor but situates cyberspace in the realm of the literal, setting the ground for much of the theory that follows. At this point I think it is important to disagree with Turkle and remember that this space is a metaphor, it is not actual or virtual but wholly imaginary. Also, if we are to think of digital space as a constructed space we must conceptualise it in relation to time, and acknowledge the way that it changes over time as a result of process, not as Turkle, among others, does, as merely an embedding cyberspace that exists each time one logs onto the Internet.

The space metaphor is a tool of explanation, but one that also obscures other characteristics of new media culture. The metaphor, as pointed out in the introduction, can be readily seen in the development of the technological discourse of Internet users. For instance, companies and individuals can have a 'site' on the Internet, information

travels along 'highways' and we are able to exist in 'my space', which has evolved from the now largely outdated 'chat rooms' or 'multiple user dungeons', thus meeting one another in a supposed 'virtual space'.

Also, many concepts recruited in order to describe the new media object through a representational aesthetic paradigm, have pre-disposed theorists to spatialise the new media artefact. For instance, in terms of traditional art theory, the rhetoric theorist Richard Lanham initiates concerns with the space of painterly representation as opposed to actual three-dimensional space. For Lanham there is a dichotomy between looking *at* the medium in order to see patches of paint on the surface of a painting and looking *through* the medium to see the space that the paint represents.[53] The new media theorists who adopts Lanham's thinking, such as Bolter and Grusin, see artistic representations as occupying both real and 'virtual' space.[54] Following this logic they are able to separate physical space and this 'virtual' space that becomes apparent in interactions with digital media, and to further situate this 'virtual' space as a 'cyberspace'. Subsequently they are then able to dichotomise real space and 'cyberspace' and investigate the consequences of the convergence of these two spaces. Whilst valuable theory may arise from this approach, especially Bolter and Grusin's concepts of remediation, immediacy and hypermediacy, it initiates a theoretical paradigm that neglects the temporal in place of the spatial.

As Gibson-Graham argues, the spatial metaphor promotes an asocial and absolute conception of space, seen in McLuhan's and Turkle's space, that is merely to be thought of as a container of events, ignoring the examination of abstract or differential space. Gibson-Graham is concerned, along with social theorists and geographers such as Henri Lefebvre, Neil Smith and Cindi Katz, that this type of theory takes as its unexamined grounding a conception of space as a simple emptiness, or field, in which all things are situated or located.[55] This type of space remains unchanged throughout time; it is merely conceptualised as an ahistorical space in which events play out. Following Claire Colebrook, and here readings of Deleuze, we must move beyond conceptualisations of space as a pre-existent container of events and toward a conception of space and

structures as being created by a flow and synthesis of events.[56] I am not suggesting here a preoccupation with the temporal in a way that merely reverses the binary opposition and neglects space. But, rather than either thinking the spatial per se or thinking the temporal per se, I suggest a shift in theory towards thinking about the spatial and the temporal together; in particular, thinking about the consequences of the temporal aesthetics of interaction with the digital in relation to notions of digital space. This will allow me to examine, following Colebrook, the way in which space, as a particular milieu or collective of forces, is impacted on, and may be in fact produced, by the process of events in time. This is the subject of Chapter 5.

Lefebvre has already pointed out that the spatialisation that he sees taking place in the social realm negates the temporal aspects of the social and cultural. As Lefebvre states,

> Time is disappearing in the social space of modernity…It is the time of living, time as an irreducible 'good' which eludes the logic of visualisation and spatialisation, as far as it has a logic. Raised to ontological dignity of philosophers, time is killed by society.[57]

For Lefebvre, the contemporary preoccupation with space is linked directly to life under capitalism. As Rob Shields points out, Lefebvre argued in *The Production of Space* that the absorption of time was linked to the alienation and neurotic everyday life that was produced by the system of capitalism.[58] I am not necessarily concerned with the Marxist discourse of production and ideology that Lefebvre takes up. But what I am concerned with, similarly to Lefebvre, is the way in which social spatialisation filters into a spatial way of thinking and the theoretical positioning of various concepts; for me particularly, the theorisation of the representational and interactive qualities of digital art. I do not want to reject outright all theory that addresses the spatial aspects of aesthetics; I agree that an investigation around the convergence of space-as-represented and space-as-experienced is theoretically advantageous to understanding the digital. However this type of theoretical discourse must also be framed by questions of time, particularly, but not exclusively, when examining time based works of art. Along with our concerns with space-as-represented and space-as-experienced, we must just as rigorously concern ourselves with the convergence of time-as-represented and time-as-experienced.

1.2 Theorists of Space and the Digital

Use of the spatial metaphor is found in both social theories of networked technology and also aesthetic theories of media art. Sociology recruited based on the emergence of the Internet as a social phenomenon, has led many to postulate that the Internet exists as a virtual third place, a meeting and socialising space, thus continuing and popularising the space metaphor. Theorists such as Charles Soukup and Lori Kendal, following in the already mentioned wake of Turkle have sought to explain the social interactivity of Internet users in relation to Ray Oldenburg's sociological theory of "third place."[59] For Oldenburg, the "third place" is a place where one can get away from their first place, being a family place, and their second place, being a work place.[60] This space, for Oldenburg, is a space that provides the infrastructure for the forming of human relationships. For theorists such as Turkle, Soukup and Kendal, the Internet exists as a 'virtual' third place, a space in which users can transcend the actual space of their daily lives. Thus, they propose a dichotomy between 'virtual' social space and actual social space; users either existing in one space or the other. In sympathy with this spatialisation, theorists and artists such as Martin Rieser and George Legrady adopt the spatial metaphor in describing interactive media installations. Rieser describes the digital encounter within immersive environments as taking place in a 'magical space', one that he sees directly relating to the user's unconscious.[61] For Rieser, in opposition to Soukup and Kendal, the physical and the virtual space, rather than being compartmentalised, converge. In agreement, Legrady proposes that the interactive installation be seen as a localised socialised space, a space in which the user is coupled to the 'virtual'. As such, the space of the digital encounter becomes a site of discourse between the two spaces.[62] Both Legrady and Rieser cite the convergence of virtual and actual space to provide the potential for new spatial experiences, thus moving beyond the approach to theorising interaction offered by the above-mentioned theorists of Internet use. However, for both Legrady and Rieser, this convergence occurs in the eternal present, neglecting questions of time.

The promotion of the spatial metaphor to describe interactivity becomes readily apparent in Nick Couldry and Anna McCarthy's *MediaSpace: Place, Scale and Culture in a Media Age.* The editors and contributors to this text position the digital firmly in the spatial in

order to propose that electronic media and social processes are allied within space.[63] Couldry and McCarthy argue that 'mediaspace' becomes inextricable within everyday spaces in such a way as to produce new senses of space. They argue that 'mediaspace' not only produces but is also produced by existing social spaces. As such, their investigations are aimed at uncovering how media represents space, the way that different types of media may link or network space and the way that media alter our once geographical specific experiences. Shaun Moores' essay "The Doubling of Space", following on from Paddy Scannell's theory of the doubling of place, proposes that new media can act as an alteration for "possibilities of being" due to the user being able to be present in two places at once; 'virtually' at the place presented by the media and physically at their position in front of an interface.[64] Scannell's concept asserts that "public events now occur simultaneously in two different places; the place of the event itself and that in which it is watched and heard. The media then vacillates between the two sites and creates experiences of simultaneity, liveness and immediacy."[65] Following this, Moores argues that media multiply the interconnectedness of previously delineated spaces; he states that "place, and experiences of being in place, can be pluralised in and by electronically mediated communication."[66] Ananda Mitra and Rae Lynn Schwartz, in agreement with this position, present a notion of cybernetic space as a means to rethink the interconnections between real and digitally constituted spaces. Thus, as the authors synthesise real space and supposed cyberspace, they continue the space metaphor and raise it to the level of ontology.[67]

Phil Graham, as a proponent of a spatial theory advances the metaphor of space, proposing that cyberspace literally *is* concrete space. Graham cites economic reasons for this claim: as cyberspace can only be used effectively if it is owned exclusively, thus, like private property, it is real and concrete.[68] He takes the metaphor even further toward ontology by proposing that cyberspace be viewed as existing as a ubiquitous other dimension. One in which the movement of individuals is becoming subject to large corporations as the cyberspace becomes privatised, thus enclosed. For Graham, and others, such as Saskia Sassen, John Armitage and Joanne Roberts, the metaphor has become a reality.[69] They attempt to make the metaphorical space of the digital into a

literal space that mirrors physical space. The metaphor thus attempts to position the digital as something that it is not; as DeLanda states, metaphors tend to obscure the topology of a concept, in this case, limiting our understanding of interactions with the digital.[70]

The spatial metaphor positions the user as navigating through an imaginary cyberspace, de-problematising interaction, as the user is positioned as an extended cognitive system, operating in a controlled and predictable manner. This is the type of space that is promoted by the now ubiquitous network maps (fig. 4-5). These images attempt to map the process by which a user navigates the space of the network in order to access and organise information. The user is viewed as navigating through space in an eternal present, reorganising information in a nonlinear and atemporal space. For instance, Lisa Parks positions the user as moving through the 'place of the interface', derived from a geographic, photographic and linguistic system of operation.[71] As such the user is viewed as making controlled choices in an atemporal zone.

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Figure 4.
Jeff Brown, 3D model of the vBNS Network
Image from "Topology Maps of Elements of Cyberspace" in *An Atlas of Cyberspace,*
http://personalpages.manchester.ac.uk/staff/m.dodge/cybergeography/atlas/topology.html

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Figure 5.
Young Hyun, 3D hyperbolic graphs of Internet topology
Image from "Topology Maps of Elements of Cyberspace" in *An Atlas of Cyberspace,*
http://personalpages.manchester.ac.uk/staff/m.dodge/cybergeography/atlas/topology.html

In the spirit of this spatial metaphor and the mapping of process into spatial representations, Manovich identifies a type of interaction and reorganisation that acts as customisation through branching-type interaction (fig. 6).[72] Manovich describes this as the type of interaction

> …in which all the possible objects the user can visit form a branching tree structure. When the user reaches a particular object, the program presents her with choices and then allows her to choose among them. Depending on the value chosen, the user advances along a particular branch of the tree.[73]

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Figure 6.
An Example of Manovich's Branching Type Interaction

In this graph we can see that interaction is reduced to the navigation through particular nodes in a system. Michael Joyce explains the making of meaning within a hypermedia

version of interactive narrative in a similar fashion. Joyce explains that this type of narration always exists strictly as a plurality of potential meanings, with users encountering data in space; as Joyce states "the meaning of narrative is not in its space but exists for the space of its unfolding."[74] For Joyce, the experience of an interactive narrative is thus uncovered as the user traverses a system in digital space.

This linear form of interaction lends itself to a narrative structure. It is thus easily understood and navigable by the user within contemporary culture, due to the historical inculcation of linear narrative logic and our subsequent reading habits. However, as Ken Feingold points out, this type of interaction, or human-computer discourse, is limited and one-sided. This is due to the user's desire for control and resistance to any form of interaction that sees them giving this control over to the machine.[75] But in reality, and as will be argued in Chapter 4, the interactive relationship that is formed between digital and physical processes is not controlled by one side or the other; the user does not merely encounter and use a passive set of data in an embedding space. Rather interaction should be a transactional relationship in which the interactive event is constituted by the responses that emerge as the digital and physical occasions work through one another. After all, we do not involve ourselves in the world by making controlled choices, rather we are involved through our active experiences, responses and transactions. As Graham Weinbren states, "we affect things in our lives not by making choices, but by actively responding to situations…The interface of an interactive cinema cannot restrict itself to a model of choice…response is the operative concept."[76]

Obviously the complexity of interaction is not always reducible to Manovich's branching type; other forms of interaction exist. Marie-Laure Ryan graphs these into structures which she terms *The Complete Graph, The Network, The Maze, The Directed Network, The Hidden Story, The Braided Plot* and *The Action Space* (fig. 7-14).[77] Although helpful to an understanding of the navigability of interaction, Ryan's graphs, the above examples of network mapping, and Manovich's explanation, stress space and neglect to explain the highly differentiated temporality of interaction. This methodology understands the user as

interacting in a linear and uncomplicated fashion. It fails to consider complex occasions and relationships that constitute the digital encounter as an event in time.

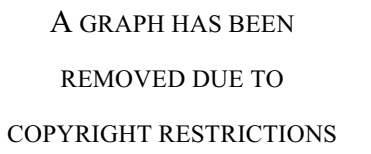

Figure 7.
The Complete Graph

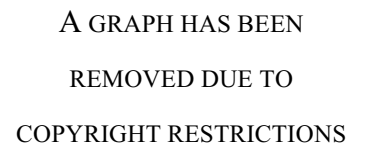

Figure 8.
The Network

Figure 9.
The Maze

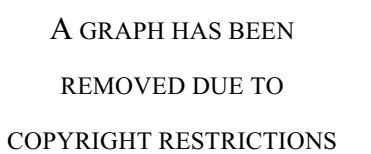

Figure 10.
The Directed Network

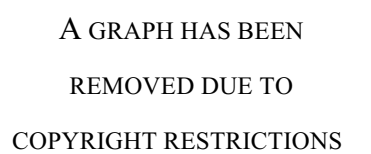

Figure 11.
The Vector with Side Branches

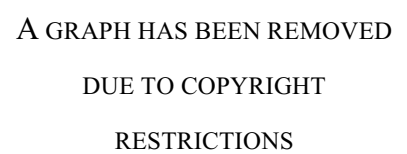

Figure 12.
The Hidden Story

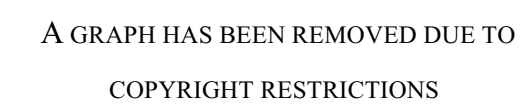

Figure 13.
The Braided Plot

Figure 14.
The Action Space

Images from Marie-Laure Ryan 's *Narrative as Virtual Reality: Immersion and Interactivity in Literature and Electronic Media*

These spatial concepts, used to describe the pragmatics and design of interactivity, continue in the explanations around the convergence of the digital and the physical. Anna Everett comments on the desire of the media user to retain a sense of the primacy of the physical.[78] Everett cites Lyotard in describing the persistence of the body; she explains that the body may be considered the hardware to human thought. Here, Everett, in agreement with Michael Heim's promotion of the virtual realist position, promotes the experience of the digital through the user's experience of the physical; this is achieved through establishing a relationship between the two spaces via the interface.[79] Everett positions the space of the virtual as coupled to the space of the physical. Everett's theory privileges the physical as the site of production; she neglects however to theorise the feedback loop and interrelationships that necessarily occur between the technology and

the user, both affecting one another. Everett, as Manovich does, positions the user as navigating through space, although for Everett this is done through an imposition of physical space onto 'virtual space'. The user, in this type of theory, is thus thought to exist within a digital substratum.

Manovich's adoption of the spatial metaphor allows him to describe the augmentation of space produced by the above-mentioned convergence of space. Through the examination of augmented space one becomes aware of the interrelation that is established between the physical space of the viewer and the virtual space of the data. Manovich describes this as the digital technology entering into the physical space to produce "cellspace."[80] Cellspace occurs when the invisible layer of information gives data to the physical space.[81] The physical space is changed; it is augmented by the digital. The 'virtual' space is also changed as it takes data from the physical. Thus, the physical space becomes a data space, the 'virtual' either "extracting from it or augmenting it with data…data flows *from* the space and *into* the space."[82] Following Legrady, this mutual flow between material and virtual spaces constitutes the meaningful existence of the interactive work. Legrady writes, "the interactive installation takes place in a spatially delineated, architectural space. It and the surrounding area are a localised, socialised space, a site of discourse, and therefore an intrinsic, constituting element pertaining to the full meaning of the work."[83] For Legrady, the interactive installation brings together the space of the viewer and the space of the artwork in the one architectural space. While I agree with the importance that Manovich, Everett and Legrady give to the convergence of the digital and the material spaces that takes place in the digital encounter, and their notions of 'data flows' between these spaces, in order to understand the aesthetics of interaction we must also consider the aesthetic consequences of the overlay of physical time by digital time, and the process based aesthetics that are performed over time as these spatially and temporally delineated zones work together.

The prominence of concepts of space can be seen in the way these thinkers approach questions of interactive aesthetics. For instance, Manovich describes the way in which new media overlays social reality by citing a convergence of actual and 'virtual' spaces.

He indicates that traditional cinema, as representative of old media, required the viewer to be still; the space of the screen and the space of the cinema were separate and one could only exist in one space or the other.[84] He points out that this immobility is challenged by the interaction of space evident in new media, most overtly by VR. The navigation tools of VR usually require physical movements, for instance Char Davies' *Osmose* (1995) (fig. 15) requires the movement of the user's diaphragm. As Legrady points out, the linking of the user's physical body to the VR technology makes one acutely aware of this contact;[85] the user recognises that she is experiencing virtual space overlayed by her movements within physical space; the two spaces converge. In terms of an aesthetic re-presentation, the new media image, as Valie Export indicates, "…has no place; it occupies space."[86] That is, the reality that the digital apparatus captures and the image that it presents can no longer be dichotomised. Importantly though, the object that is generated by the digital system is thought to occupy a digital or 'virtual' space.[87] When we interact with this object we are thought to enter this digital space. Through interaction the user is tied to the machine; the convergence of the physical with the digital sees the space of the spectator co-existing with the space of the text.[88]

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Figure 15.
A Participant of Char Davies' *Osmose,* 1995

I agree that digital space overlays actual space, but the overlay of actual time by the temporality of digital systems also needs to be investigated. Research in this area addresses the *processes* from which interactive relationships between the material and the

digital emerge, something which a spatial theory, due to its operation within an eternal present, cannot meaningfully achieve.

For instance, works such as Janet Cardiff's *Long Black Hair* (2004) demonstrate the overlay of actual time by the time re-presented by an artistic technique. In Cardiff's work participants wear headphones and are lead around New York's Central Park via a pre-recorded voice-over. Using binaural recording techniques that render a 360-degree sound space that mirrors the real world, the walks lead participants around pathways, developing a narrative through narrated observations and ambient sound sources that seem to surround the listener. Firstly we hear footsteps, these are the footsteps of the narrator, and we are told to try and match our footsteps to hers. Later in the work, after telling us to turn left along the street, the voice-over tells us that we see peanut sellers, which are not physically present, and we hear the ambient sound of dogs barking, getting closer to us, which again, are not physically present, but we have the sense that they once were. This aural re-presentation links the present day Central Park to historical and fictitious events re-presented, in the sense of making present again, via the headphones. Hence this work overlays the physical time of the present with the other temporal events that are narrated through the audio. In this work there is not merely an overlay of physical space by the space of the audio. Rather physical time is overlayed by the time re-presented by the audio, creating an augmented type of temporal reality. We could also think about *Osmose* in these terms, as the physical time of the user overlayed by the temporal events re-presented in VR.

1.3 Database Logic

One source for the propagation of the spatial metaphor in new media studies has been a certain devaluing of narrative logic in order to privilege the spatial logic of the database. For instance Wolfgang Ernst positions the database as providing a particular representational infrastructure for communicating and understanding reality as a discontinuous and nonlinear system.[89] This is also seen in Andrew U. Frank's position that the organisational structures that we are invested in may generate a specific ontology.[90] For both Frank and Ernst the database causes us to see, think and experience

the world as a spatial system of data, rather than a temporal system of events. As well as this, Manovich argues that new media uses the database as its central cultural form. In *The Language of New Media* he seeks to provide an understanding of the relationship between database and narrative which positions database as paradigm and narrative as syntagm.[91] In doing this, he dichotomises the function of narrative and database; he states, "…database and narrative are natural enemies. Competing for the same territory of human culture, each claim an exclusive right to make meaning out of the world."[92] For Manovich the database forms a paradigm in which all the possible data is stored, from which selections may be combined to form a syntagmatic narrative, which is the stringing together of certain pieces of the data set in a linear fashion. [93] Manovich points out that the traditional syntagmatic narrative of, for instance, a novel is explicit and thus privileged, and its author's paradigmatic mind is implicit and inaccessible. New media reverses this distinction, in that it privileges paradigm; the database is at the centre of production. For Ernst, Frank and Manovich the perceived spatiality and nonlinearity of the archive is thus privileged in place of temporality and linearity. However, as I will point out over the coming chapters, time is not necessarily linear and valuing the database need not mean valuing purely spatial thinking; I will argue that there is a nonlinear temporality of the database which nests various actual occasions and constitutes the multi-temporality of interaction with digital systems.

Manovich's propensity to view media in terms of space rather than time can be attributed to the specific spatial theories that he recruits from the art history of Alois Riegl, Heinrich Wölfflin and Erwin Panofsky. These thinkers form a framework for Manovich's argument and lead to a privileging of questions of space over questions of time.[94] In Manovich, we can see Riegl's privilege of the aesthetics of the two-dimensional static representations of nature in one unified optic field over the three dimensional representations that occupy actual haptic space. In other words, both Riegl and Manovich are interested in history and time in as much as it is re-presented and flattened by spatial systems of reproduction. We can also see Wolfflin's argument that the mode of seeing and representing space is inextricable to the social climate, and Panofsky's similar proposition that advances in spatial representation led to a development in systematic

thought.[95] Following Riegl, Wölfflin and Panofsky, Manovich positions database aesthetics as a mode of representation that is able to change both individual and social thinking; specifically, as with Ernst and Frank, it promotes a way of thinking about the world as a collection of data.

By understanding the digital encounter as a fluid intermingling of interactive events, software processes and the archived information of the database, rather than understanding interaction as a user that encounters and manipulates data, we can move away from a purely spatial understanding of interaction and database aesthetics. I instead move toward a view of the existence of digital and physical occasions within new media culture as, following Deleuzian ontology, a machinic assemblage.[96] That is, as heterogeneous agents that combine and subsequently coalesce. The collective here is a combination of forces, traits and structures, emanating from both the machine and from the participant, that combine to form the condition or ground for the interactive event. This is similar to Henry Jenkins' theorisation of media convergence and Mathew Fuller's concept of media ecology, both of which see a flux of information across the processes, components and practices of various forms of media.[97] For both these theorists, media processes work through one another, occasions of new media work with occasions of old media, processes of digital systems work with processes of physical systems; these comminglings then form a digital/physical collective or milieu, which tends to direct the further processes of its digital and the physical parts. [98] Here, to understand the digital encounter it is not enough to think of a 'user' and a machine as a subject to an object, as two independent entities. Rather, the 'user' and the machine should be understood as *opportunities for engagement,* from which experience and process emerge, as overlapping elements of the digital/physical milieu.[99]

In this chapter I have firstly highlighted the problems that are associated with a theory of new media art and interaction that focuses solely on its spatial qualities. I then investigated specific instances of the spatialisation of the aesthetics of new media, the properties of networks and the way in which meaning is made by databases of information. This then lead into the final investigation of the relatively recent

development of database aesthetics, which have traditionally been used to view the digital outside of questions of time. In the coming chapters I hope to develop a new framework through which to view database aesthetics and interaction, to in essence, provide an approach to media art that rigorously examines its temporal qualities and uncovers the ways in which a new experience of time might be revealed.

CHAPTER 2

Toward an Understanding of Time.

Panta Rhei (all things flow)

Heraclitus

Heraclitus' notion that all things flow directly relates to the theoretical framework that I will enact and develop throughout this thesis. For Heraclitus, as well as for Whitehead and Deleuze, reality is not a constellation of stable *things* but one of *processes*, which cannot be substantialised into *a-priori* things or substances. Importantly this includes thinking of a user as a self-contained substance at a particular point in space, such as a point on a graph or a point on a map. This is because, as Whitehead states, it is not stable things but the fundamental forces and the fluctuating activities that constitute reality.[100] For instance, in relation to the theories of media ecologies and convergent media proposed by Fuller and Jenkins, mentioned at the end of the previous chapter, Whitehead would insist, inline with these theorists, that it is not so much individual media objects or content that should be the focus of inquiry. Instead Whitehead's position would be that media objects and content take their form from a process or flow of information between digital and physical occasions. Whitehead adds, "If we are to look for substances anywhere, I should find it in events which are in some sense the ultimate substance of nature."[101] We can transplant this thought to the digital encounter and see that it is not a 'user' and a machine that constitutes the encounter; it is rather made up of the relations and activities that are brought about by the interactive event.

Examples of digital processes that provide the oppurtunities for forms to emerge includes things like the digital system's transmission of code into visual images. We see here that it is the process of the flux of code that generates the existence of the multi-modal forms of the interface. Without process these aesthetic forms would not exist. Taken further, we can see that, in any interaction with digital systems, it is the movement of the participant and the detection of this by the system that causes the software processes that provide the

condition for digitally generated forms to emerge. This may take the form of moving a mouse or touching a keyboard or larger physical movements such as moving around a room sensed by motion detectors, or the simple act of breathing sensed by a sensor belt. To take this event further, we see that the participant's movements are caused by other processes, such as cognition, affect, muscle contractions and other physicalities. Further still, these processes are caused by smaller atomic occasions. When we trace this back to the smallest level of occasions we arrive at what Whitehead terms an actual entity.

For Whitehead things or substances are abstractions, they are examples of what he calls 'misplaced concreteness'.[102] Concreteness can only be found in process; it is merely the lowest nest in the nesting of occasions of process.[103] As Whitehead points out, when we think of substances, we merely think of the limit point of a series of occasions that extend over one another; we merely think of the outcome of processes. For Whitehead every material thing that we encounter in our daily lives is an outcome of processes and events. Thus, digital aesthetics and the affects of these are merely the limit point of the multiple occasions that are nested within the digital encounter.

In this theoretical framework, as opposed to the spatial theories discussed in the previous chapter, process is fundamental. For Heraclitus the river is not an *object*, but an ever-changing flow; the sun is not a *thing*, but an ever-changing fire. Everything in nature is a matter of process, of activity, of change.[104] Following this, the idea of an unchanging subject or object is completely abandoned, and we can use this position on process to think about the relationship formed between an interacting 'user' and a machine.[105] As Whitehead states, following Heraclitus, "the ancient doctrine that 'no one crosses the same river twice' is extended. No thinker thinks twice; and, to put the matter more generally, no subject experiences twice."[106] This is because the subject and the thinker are remade at every instant of duration, and further, experience arises from this remaking. Understanding the aesthetics of digital art within this framework does not account for particular media objects, individualised users, or outcomes of interaction. Instead this type of theory privileges the processes that constitute the objects of media.

DeLanda provides a means to think about this in relation to his philosophy of contemporary science. Examining the evolution of technologies alongside the evolution of biological matter, he points out that evolution occurs as the flow of matter through genealogies, not the specific materiality that emerges from these flows. DeLanda states, "over the millennia, it is the flow of biomass through food webs, as well as the flow of genes through generations that matters, not the bodies and species that emerge from these flows."[107] For DeLanda, as for Heraclitus, the entire world is a process of complex flows from which life and experience emerge.

In the previous chapter I outlined the consequences of a new media theory that takes the temporal qualities of new media and flattens them to fit into spatial concepts. In this chapter I introduce a theoretical framework through which I will later read the temporality of numerous works of media art. Firstly, I outline Whitehead's conception of time; this discussion forms a basis for the application of this theory to media art and the development of this process-oriented approach into a temporal aesthetic theory. After an introduction of this process philosophy I then investigate the concepts of time that are invented by Deleuze in order to set a theoretical framework through which to theorise the affective events that occur through interaction with the digital. Deleuze is particularly useful because of his work theorising the virtual and the actual, which corresponds with and furthers Whitehead's process philosophy. Furthering this, I introduce a theory of multi-temporality readily extrapolated from Serres' philosophy of presentness as a "turbulence" of flows and eddies, constituted by nonlinear temporal relationships. This adds to the previous discussion of Whitehead and Deleuze and contributes to the paradigm which allows the particular temporalities of interactive media art to become elucidated.

There has been a recent resurgence in the interest in Whitehead's philosophy, particular regarding contemporary media and cultural theory. Whitehead has been used by theorists such as Isabelle Stengers, Andrew Barry, Mike Michael, Andrew Murphie, Steven Shaviro and Michael Halewood.[108] Generally speaking, Whitehead has been used by these thinkers to cast a new light on the debates surrounding materiality, subjectivity and

objectivity. For instance, Michael uses Whitehead to investigate the day-to-day experience of contemporary life as the meaningful connections, or nexus, formed between technology, nature and humans.[109] Similarly Halewood, directed by Bruno Latour's earlier adaptations of Whitehead's philosophy, uses Whitehead to propose new models with which to think about relationships between subjects and objects. In addition to this Halewood, through his adherence to Whitehead's concepts of consciousness and experience, is able to propose that social theory return to questions of ontology.[110] In this thesis I add to this conversation by investigating the way in which Whitehead's process philosophy, particularly his theory of time, can be worked through an aesthetic theory of digital art.

2.1 Alfred North Whitehead's Time

Whitehead asserts that no entity can be conceived in complete abstraction from the universe. Hence, questions of aesthetics, particularly those that pertain to diachronic interactions, must be thought of as within the flow, or durational passage, of nature. Any attempt to view reality outside of reality leads to abstraction, obscurity and misrepresentation.[111] Following on from this, Whitehead forcibly asserts that reality is made manifest by the events or processes of actual entities, sometimes called actual occasions. In this thesis I use both these terms to signify the smallest occasion or entity within the process of the world. Whitehead uses the term 'entity' in the Latin sense, meaning 'thing'.[112] But importantly these 'things' or 'entities' are always in process. They are always *happening*; the entity is always an occasion. As Whitehead states, "an actual entity is a process in the course of which many operations with incomplete subjective unity terminate in a complete unity of operation, termed 'satisfaction'…the process itself is the constitution of the actual entity."[113] The actual entity is in constant process toward its satisfaction, towards its becoming; once this satisfaction is achieved the actual entity begins to perish in order that another actual entity may begin its becoming. Whitehead attributes this process to every entity in the universe and it is this process, the becoming and perishing of actual entities, that initiates what we commonly would think of as objects.[114]

For Whitehead, temporal reality is produced by process: in particular, the creation of actual entities at every moment in time. An entity at one instant forms a nexus with another actual entity, at the next instant, exchanging information and subjective form, prior to its perishing, and thus creating continuity between entities over time. This continual trace or nexus that runs between occasions, after Whitehead, constitutes the becoming of continuity that we experience as the passage of time.[115] For instance, a musical note is not heard in isolation; rather, in order to comprehend the entire melody, it is imbued with the notes that come before and after it.[116] For Whitehead, this is how time is experienced, as every actual occasion retains within itself past and future occasions. He states, "what we perceive as present is the vivid fringe of memory tinged with anticipation."[117] Whitehead refers to this experience of time as the 'passage of nature', a process or flow in which the entirety of nature is involved, a process that Bergson would refer to as a duration.[118]

Understanding the notion of an actual entity is crucial to understanding Whitehead's philosophy. Actual entities, as Whitehead describes them are the last real things of the universe.[119] They are the basis for being and where any philosophy must start; there is no going behind them to find something more real.[120] Thomas Hosinski provides a definition of an actual entity as a single moment of experience. This single moment however is extremely complex, as it bears with it relationships to all the moments that occur before it and all the moments that occur after it.[121] So we can think of the actual entity as a state of presentness in which the past and the future are immanent; it is, as put forward previously, at the vivid fringe of the past whilst being tinged with the future.

It is important though that the notion of an actual entity not be confused with the notion of matter. An actual entity, as Hosinski indicates, is not a subatomic particle, or any 'thing' that the scientist could see through the microscope. As has been already pointed out, Whitehead uses the term 'entity' as the Latin equivalent for 'thing', and he asserts that all thought must be about 'things'.[122] For Whitehead, however what constitutes an entity or a 'thing' is its process. As he overtly states in his Categorical Scheme, "*how* an actual entity *becomes* constitutes *what* that actual entity *is*."[123] Thus all thought should be, in

essence, about process. The process of an actual entity occurs as it begins its becoming by forming a nexus with a previous entity, which has already begun its perishing. The entity then 'prehends', or grasps, external information through this nexus, which is processed through the entity's subjective form. This is an example of the present entity or occasion being informed by the past. The entity then reaches satisfaction and begins perishing in order that another entity may be brought into existence. This is the perpetual process of actual entities and what gives them their individual character.[124] Things that we encounter in reality, such as people, plants and buildings, are societies of actual entities; as Whitehead states, "the real actual things that endure are all societies."[125] These material things are the becomings of a complex of processes.[126] They are the outcomes of a multiplicity of events. In other words, the actual thing is the atomisation of actual entities as they form a society. This is important for Whitehead because a society of actual entities has a history, which expresses its changing reactions to changing circumstances. Thus a society, such as a human, a work of art or a machinic system, is able to construct a self-identity over time. A single actual entity has no history, it simply becomes and perishes.[127]

An actual entity never actually moves or changes, it either exists or does not exist. But this is a simplification – an actual entity never actually exists. It is either in the state of becoming as it gathers information from other actual entities so that it may exist, or it is in the process of perishing as it ceases to exist as a self-creating entity and its content becomes available for inclusion in some subsequent actual entity. An actual entity is never static, in the sense that it never actually exists, it is always pre-existent or post-existent. This dying off of every actual entity in every moment, in order to make room for subsequent actual entities is the perpetual perishing of time.[128] As A. H. Johnson points out, Whitehead's temporalisation of nature is an atomic succession of actual entities.[129] As Whitehead himself states, "the continuity of nature arises from extension. Every event extends over other events, and every event is extended over by other events."[130] Hence, the process by which actual occasions extend over one another manifests the temporal passage of nature.[131] Time emerges from process.

As Michael Epperson points out, for Whitehead, in accordance with quantum mechanics, the universe is understood as a multiplicity of events. Each of these events, termed an actual entity, evolves by the process of prehending and integrating all the preceding actualised events that the universe has brought into being.[132] This is the immanence of the past in the entity's state of presentness. As an actual entity dies off it achieves objective immortality in the sense that it continues to exist for ingression in the next actual entity. Whitehead describes this as the actual entity's existence within the extensive continuum – a concept that is similar to Deleuze's virtual – in order to provide potential for the becoming of the world.[133] I will extensively deal with this concept of the virtual in Chapter 4, and deal more specifically with the extensive continuum in Chapters 3 and 5. For Whitehead as for Deleuze, after an occasion or entity perishes it no longer exists in actuality, but, as it survives in the extensive continuum, it exists as virtuality. Through these concepts, both Whitehead and Deleuze account for the past's existence and influence in the present. Thus, within a Whiteheadian concept of temporality, the way something becomes is brought about through interaction with the potential immanent to the extensive continuum; this can be thought of as a past that continues to be felt in the present.

Extrapolating from Epperson's reading of Whitehead, duration unfolds quantum event by quantum event, or in Whitehead's terms, actual entity by actual entity.[134] The temporally contemporary occasions in this unfolding and differentiating multiplicity overlap one another, thus forming a temporal and spatial structure that is in a constant state of 'being made'. For Epperson, the direction that the present takes is directed by the information given by the past and the potential futures, provided by the extensive continuum. Each of these events evolves by the process of prehending and integrating all the preceding actualised events that the universe has brought into being.[135] Thus, within Whitehead's temporality the information of the past, as it is immanent in the present, directs the actualisation of the present occasion. At the same time, the information of the future, which involves a field of potential, limits the shape that the present occasion may take.

For instance, in an interactive artwork such as Shaw's *Web of Life,* mentioned in the introduction, the information from the past, taking the form of data gathered from hand prints scanned into a database, directs the generation of digital images and the aesthetics of the work in the present. As information is added to this collection of past data from the various networked locations, the aesthetics of the work change. Also, the future directs the actualisation of the present as it sets limits upon what the system can achieve. At every moment the system is involved in actualising new and unforeseen images. However, these images are based upon a set of rules and procedures inbuilt into the machine by its programmer. In a sense, the future here is the potential that is immanent to the machine. It is a field of potential that restricts the system to operate within its limits. At every moment of interaction time is experienced as a past and future that directs the present.

Whitehead deals exclusively with time in a chapter of *The Concepts of Nature* and develops a theory of time throughout the process philosophy built in *Process and Reality* and *Adventure of Ideas.* In *The Concepts of Nature* Whitehead explains that durations within time can be thought of as moments with jagged boundaries, with no sharp junctions between these moments.[136] It is as if each moment of duration extends over the other contemporary moments; one moment does not begin and end, rather it extends past the confines of its duration into the duration of other moments. Every event extends over past and future events. This extension is what Whitehead refers to as the nexus formed between actual entities. Also, contemporary entities extend over one another due to their mutual involvement in each other's past, future and present.[137] Thus, in the digital encounter, the occasions of the software, such as the asynchronous transmission of code, and the occasions of a human user extend over one another, they overlap. In this event, the occasion of a human user is brought into relation with the complex temporality enacted by digital processes.

Whitehead's theory is the foundation from which I argue that a distinct duration, as apart from anthropocentric duration, emerges due to interaction with digital systems. This temporal nature of the digital encounter emerges as the consequence of the mesh between

the temporality that is an outcome of machinic processes and the temporality that is the outcome of physical processes. In other words, as the occasions of a 'user' and the occasions of a machine overlap, so does the temporality of these occasions. For Whitehead and for Deleuze these two experiences of time would not simply occur within a homogenous continuum of space-time, which is commonly thought of as a pre-established container for events. Rather, the events within each domain evolve in heterogeneous ways to *create* multiple domains of temporality. It is the events of the digital that manifest the temporality in which they play out. By this process the time of the digital encounter becomes complex and can no longer be understood as a linear series of events. Here the nonlinear structure of the database intersects with our everyday experiences. In this encounter events felt in lived time extend over past events archived in the database and digital events generated by the machinic system; these are the multiple temporal rhythms that work together in the interactive event, constituting a multi-temporal duration.

In *The Concept of Nature* Whitehead provides the theoretical foundation for the idea of temporal thickness that I use to propose the multi-temporal duration, previously discussed in the introduction, that is both produced and encountered in interaction with digital aesthetics. To introduce this concept Whitehead describes the simultaneity of the components of a duration.[138] He states that a duration retains within itself, through the process of extension, antecedents and consequents outside of the specious present. The duration is thus thick with temporal information, outside of the present that is open to our sense perception and directs our traditional measurement of passing time. It must be remembered that Whitehead and Deleuze's time, and the concept of time that I enact in this thesis, focuses on the *nature* of time, not on its *measurement*. That is, I focus on the type of time that is a virtual precondition for traditional time measurement. The present as it becomes thick contains elements of the past and future, as, for Whitehead, every actual entity that marks the present moment forms a nexus with actual entities of the past and future.[139] As Whitehead states, "A duration retains within itself the passage of nature. There are within it antecedents and consequents which are also durations which may be the complete specious present of quicker consciousnesses. In other words, a duration

retains temporal thickness."[140] Within every duration there are thus varying scales of the temporal. Within the act of becoming that takes place, for instance, within a second, there is also another becoming that takes place in half a second and another that takes place in a quarter of a second and so forth.[141] These varying scales of the temporal are nested within every moment in time.

Every moment in time is thus a moment of becoming as every actual occasion is created anew at every instant. Whitehead's process philosophy completely does away with any concept of objects that endure unchanging through the past, present and future – including the human subject. Following this thinking, he wishes to abandon the subject/object preoccupation that he sees as dominating and impoverishing Western philosophy, an endeavour that Deleuze continues in his own philosophy.[142] This may allow us to understand the interactivity of the digital encounter outside of the usual 'user'/data or 'user'/machine model that encounter one another in space, instead understanding the encounter as a forming of a collective or a milieu, as a process in time. A dualism such as the division of the world into subjects and objects is another example of 'the fallacy of misplaced concreteness'.[143] This is made clear in *Adventures of Ideas,* in which Whitehead points out that the subject/object relationship is based on a knower/known model, with the subject positioned as the knower.[144] This is Whitehead's point of contention. He goes on to argue that only a small part of experience is that which is known consciously by a subject. For Whitehead, experience exists outside of human consciousness. In fact, for Whitehead consciousness is to be thought of as being prompted into existence by external datum.[145] Following on from this Whitehead concludes that, because experience is constitutive of consciousness, experience may exist without consciousness. For Whitehead it is not the subject/object relationship that is constitutive of experience, rather experience should be thought of as the commingling of both consciously experiencing and non-consciously experiencing entities. I pick this idea up in Chapter 4 where I propose that we view interaction as an eventful transaction between two conditions, the condition of the digital and the condition of 'userness'. This approach focuses on the relationships generated by the event of interaction rather than centering on a model that privileges the human.

For Whitehead the stone is in process just as much as an animal that moves or a plant that grows.[146] As David Ray Griffin points out, enduring individuals are not the final real things of the universe; they are made of momentary events. These momentary events, or actual entities, as successive occasions make up the enduring individual object.[147] Whitehead states, "the continuity of nature arises from extension. Every event extends over other events, and every event is extended over by other events."[148] Here Whitehead refers to the passage of actual entities in nature. In order for time to proceed, each actual entity, as it becomes and perishes, extends over the next actual entity.

One actual entity forms a nexus with another actual entity and prehends information either positively or negatively. This prehension is not to be thought of as a primitive form of sensory perception. Rather, as Griffin points out, a prehension is "… the actual grasping of the prehended object so that some aspect of that object is included within the prehending experience."[149] This is how process occurs, this is the process by which the entity is constructed and constructs itself.[150] Importantly, this act of construction is based upon the continuity of a flux of information as the past is prehended in the present actual occasion. The consequence of this is that the past actual entity is immanent in the present actual entity. The past is carried forward into the present occasion.

This can be seen in interaction with digital media. If we think of the user as a society of actual entities and we think of an instance of interactive media art as a society of actual entities, every event of interaction can be thought of as an event in which the 'user as actual entities' prehend the contemporaneous 'digital as actual entities'. These societies that overlap to form a collective are to be thought of as *contemporary actual entities,* a concept of Whitehead's that sees entities prehend one another from a contemporary position in time. As the separate societies form a collective, prehending one another across time, they also prehend one another over time. An event at one instant of interaction – for example interacting with the digital through an interface, extends over the next event of reading the consequences of this event, which extends over the next event of again using the interface to interact with the digital. The events of interaction

extend over one another, as societies of user and machine actual entities, creating the work at every instant, in order to constitute its temporal aesthetics.

This can be seen in Bill Seaman's *Exquisite Mechanism of Shivers* (1991) (fig. 16). This is an interactive installation in which the participant can re-organise text based material in order to generate pre-recorded video images and audio. In this work a database of poetic phrases is accessed and sorted through, a selection made from the archive of single words and phrases, and used to construct a poetic text. The words and phrases of this interactively composed text then links to video images and audio, triggering these in sequence with the text. Here the participant works with the potential that is pre-established by the artist's composition of source material, and the programming of the machine, to construct the audio-visual-textual experience. In the simplest terms this work can be described as a user that manipulates a mouse interface, selecting lines of text from a database, which trigger video images. However, the total experience of the work is not separable into these discrete events of interaction or information transfer. This work embodies Whitehead's above notion of extension, as the relationship formed between pieces of media content alter the substantiality of this content. For instance, the words form a relationship with video images and audio in the context of the interactively composed sentence. The substantiality of each of these pieces of media content is then constituted by the media context or milieu in which it finds itself. In other words, the text, the audio and the images, as contemporary entities, each gives aesthetic meaning to the others, altering the way that they are read by a viewer. The work, as just this collective of information, that changes over time, can be though of as a connected field of entities; they are connected via the work's composition, as Seaman has provided links between particular words, images and audio, archived in the work's database, but also connected in the work's reception, in a more poetic sense, as the entities work through one another, referring to one anther, substantiating one another and, as each entity gives the others their character, providing the aesthetics and the poetics of the work. This is produced by the relationships formed through the *process* of interaction, a process that transmogrifies potential into experience. As such, following Whitehead, substantiality is an outcome of a *process* of extension, a prehension of contemporary actual entities.

AN IMAGE HAS BEEN REMOVED DUE TO COPYRIGHT RESTRICTIONS

Figure 16.
Bill Seaman, *The Exquisite Mechanism of Shivers*, 1991

Moving on from this example, we can also think of the 'user' in these terms, as an entity that both gives its character to, and is given its character by, the collective in which it situates itself. When focusing on the user as a society of actual entities rather than the 'user as subject', each event of extension within the collective of the digital encounter comprised of various user-initiated processes and as above, these direct the aesthetics, poetics and composition of interaction. These 'user' initiated processes are what I will term the condition of 'userness'. As already stated, we are not interested in notions of a subject that apprehends the world as a welter of data. Rather, interactive aesthetic can only be thought of as an active involvement of the subject *in* the object and the object *in* the subject. Both should be thought of as entities that work together to constitute experience. As such, I view 'userness' as a particular condition rather than viewing one particular user with one particular psychology. By proposing the concept of the condition of 'userness' I am attempting to avoid any concept of an individual subject that endures through the duration of interaction. For Whitehead, as has already been mentioned, and also for Deleuze, the enduring subject does not exist: the subject only exists as a perpetual process of actual entities becoming and perishing. Thus I view the 'user' as a condition of occasions over time, not necessarily constrained to one individual. As

Whitehead points out, the appearance of an enduring subject is produced by the prehension of actual entities through duration; this process is a process of transition.[151]

This is a transition from what Whitehead describes as "the settled actual world to the new actual entity relatively to which that settlement is defined."[152] Whitehead's term "settled actual world" refers to the definite form that the collection of actual entities take at any one instant in time. The information and subjective form of each actual entity, datum that refers to the make-up of each actual entity at that moment in time, is prehended by the new actual entity, existing in a different moment in time. Information and subjective form is thus transmitted from one actual entity to the next *in* time. Every actual entity at every moment is articulated to past actual entities as it gathers information from them. Each actual entity is also articulated to future actual entities as it provides the condition for their becoming. Here it is seen that the past and the future, because of their objective existence in the present, direct the actualisation of the present.

In a chapter of *Adventure of Ideas* entitled "Past, Present Future" Whitehead makes an argument for temporal experience as the objective existence of the past and future in the present.[153] Whitehead points out that we commonly conceive of ourselves as related to past and future events by memory or by some abstract imagination, not by a direct observation of ontology. But, as he argues, this approach obscures temporalisation and tends to promote an idea of the eternal present, existing without a past or future.[154] Whitehead opposes this view and instead proposes a temporal reality that sees a past and future transpiring within every present moment. Whitehead states "each moment of experience confesses itself to being a transition between two worlds, the immediate past and the immediate future."[155] For Whitehead time is not a linear progression of points of present but rather a complex of contemporaneous pasts, present and futures.

Whitehead then goes on to point out that the objective existence of the future in the present is a different existence to that of the past in the present. Whitehead states, "the future is to the present as an object for a subject. It has an objective existence in the present." [156] The future is thus prehended by the present and drawn into the essence of

present fact. The past is also prehended by the present and drawn into present fact. The difference though is that the past involves already formed actual occasions that are able to impart causation onto the present. The future has no such actual occasions, only the necessary potential for these occasions, and thus cannot impart causation on the present.[157] Whitehead states, "the future is there in the present, as a general fact belonging to the nature of things."[158] The future is immanent in the present in that the present sets the conditions from which the future emerges. The actual occasions of the present provide the data and the subjective form that are evident within the future actual occasions. The future is thus immanent to the present in as much as the necessity for future actual occasions makes up the essence of presentness.[159] However, the present does not cause the future. The present rather conditions the formation of its successor.[160] This thinking can be brought to bear on digital media by viewing the archiving and retrieval functioning of the database as a method by which the past is carried forward into the present. Here, various sections of past may be activated by the interactive relationship formed between the user and the digital system. Interaction in these terms creates a certain relationship between the present and several segments of the past. We can also see that the future is immanent in the digital present, reflected in the potential that is manifest by the particular programming of the system. This sets the limits on the potential process that the machinic system may enact, and thus sets the degrees of freedom from which the future events of the system may unfold. Thus, seen in the earlier example of Shaw's *Web of Life,* the state of a system in the present sets the conditions for the potential processes and states that this system may take in the future. This potential is also seen in the linking capability of digital networks. Here the digital system may direct the future of interaction once again by setting particular degrees of freedom upon the paths of interaction. In this respect digital systems are able to generate relationships between the present and the potentiality of the future. These examples can be understood *events,* as acts of prehension that occur between past, present and future.

2.2 What is an Event?

The short answer to the above question is that, for Whitehead, *everything* is an event. As Shaviro states in his commentary on Whitehead, "the world…is made of

events, and nothing but events: happenings rather than things, verbs rather than nouns, processes rather than substances."[161] For Whitehead, everything in reality, including those things that have the appearance of continuity through time, are made up of a multiplicity of events. An event is not something that happens *to* someone but rather something that happens *with* or *in* them.[162] This tenet of Whitehead's philosophy can direct the way that we think about the aesthetics of interactive media. The event of the digital encounter is not something that happens *to* someone. Rather this event is an event in which the user and the machine are both invested, setting conditions on one another, producing potential for more events and limiting one another's operation. The digital encounter is thus an event that happens *with* and *in* both the user and the machine. We will see examples of this in Chapter 4.

I began this chapter with Heraclitus' famous phrase, "Panta Rhei", translated as "all things flow." Whitehead wishes to rephrase this translation as "the flux of things."[163] In terms of actual entities, nexus, and events, Whitehead asserts that we must conceive of nature as the condition of simultaneous permanence and flux. An event is the realisation of just this situation. As Whitehead states "in the inescapable flux, there is something that abides; in the overwhelming permanence, there is an element that escapes into flux."[164] We witness this permanence in actual entities; as Whitehead states, "an actual entity never moves: it is where it is and what it is."[165] Flux, however, is witnessed in the nexus that every actual entity forms with its contemporaries and through which information flows. As both these conditions occur simultaneously, reality is the experience of both permanence *and* flux.

This is perhaps best seen in Heraclitus' well known river analogy. Although there is considerable disagreement over the translation of Heraclitus, I have chosen to use Paul Harris' translation, which reads "you cannot step twice into the same river, for other waters and yet others go ever flowing on. They go forward and back again."[166] One cannot step twice into the same river because its waters are in constant flux. The permanence of the river, that thing which we call the Nile or the Danube, is constituted by the unrelenting flux, or flow, of water. For Whitehead the appearance of substances, just like the Nile or the Danube, is granted permanence by the flux of actual entities, just

like the flow of water. This flux of actual entities is constituted by the forming of a nexus between one perishing entity and one that is becoming. In this thesis I will argue that the digital encounter and the conceptual space of interaction are similarly constituted by the flux of both software and material occasions and also by the relationships that are formed as the outcome of these events.

The event for Whitehead occurs in the forming of the nexus. Whitehead explains that the term event refers to "…a nexus of actual occasions, inter-related in some determinate fashion in one extensive quantum."[167] For Whitehead a molecule or material body, as it is a moving body, with a history of local change, is not an actual occasion but rather a nexus of actual occasions, an event. The event can be thus thought of as the relationships formed between actual occasions. In terms of digital art we can see this in the event in which a user and a machine interact. Here two occasions enter into a process of interaction, in which relationships are formed that provide a conditioning or potential for the future. As with the discussion of mediation that I undertook in the introduction, there are not here two already established entities that exchange information. Rather we need to think of these entities as occasions, and importantly, as occasions that are substantiated by the *process* of interaction. In other words, the flow of information between these entities is itself constitutive of the entities in that it provides the potential for their becoming.

Deleuze answers the question "What is an event?" in a short chapter in *The Fold: Leibniz and the Baroque.*[168] Here Deleuze adopts Whitehead's process philosophy to think about the event in relation to his own work on the fold.[169] For Deleuze events are extension. He states, in similar language to Whitehead, that events exist as "…one element stretched over the following ones."[170] In other words, events are the forming of a nexus, which enable the prehension, or exchange of information, between one actual entity and another. In short, the event is the realisation of a process of extension, hybridisation and concrescence. As Whitehead uses it concrescence refers to the coming together of occasions or entities, it is the productive relationship formed between occasions. Importantly, concrescence is a process that is the outcome of extension, it is the procedure by which actual occasions take form. In the event occasions extend over every

other occasion, thus containing traces of every other occasion that has been brought into being. Everything contains everything else. The duration of an event is thick with a complex of other incorporeal events.

Andrew Murphie, in his paper "Putting the Virtual back into VR", furthers this conception of reality as a process of events.[171] Working towards a philosophy of the virtual by which to understand VR, Murphie states that the whole of the world is an event and within this event is nested other events, and in these other events are nested still smaller events, and so on. He sees VR as the literalisation of this concept of the virtual; VR is able to embody the idea of existing in a world of relations in which one event may contain the entire world of events. In the case of VR the one event, being the work's software, contains, in the sense that it digitally generates, the world of events. For instance the computational process of the VR system utilised by Davies in *Osmose,* as mentioned in Chapter 1, generates an entire world that surrounds the user. This work comprises of 3D computer generated graphics and audio, a head mounted display and real time tracking of head and diaphragm movements. Through this the user, via her breathing and head movements, navigates between multiple worlds, including an under-sea world, a clearing in the forest, a cloud world, and abstract worlds of visually represented computer data and text. As such, the user interacts with the system, regulating and focusing her breathing and her movements, to actualise specific events from its world of potential. The participant thus enacts a set of processes, initiated by her body, in order to actualise the work's interactive aesthetics. Here, the computational processes of the system, as one event, contain a world of events; the worlds of *Osmose* accessed through the VR interface are nested within the events of the software. The specific event that is actualised as the user navigates this world is an outcome of two events interacting – that of the software and that of an embodied and wired 'user'. The relationship formed between the VR technology and the 'user', as an event, is an ongoing process that actualises these other nested events.[172]

Paul Patton points out that Deleuze takes his concept of an event from the Stoics. He explains that the Stoics drew a fundamental distinction between two realms of being, a

material realm of bodies and states of affairs and an incorporeal realm of events.[173] For Patton the Deleuzian events are the "epiphenomena" of corporeal causal interactions: they do not affect bodies and states of affairs but do affect other events, such as the responses and actions of agents. In other words events are the incorporeal dimensions of material bodies. Patton gives the example of being cut with a knife. The fact of 'being cut' is neither a property of the flesh nor of the knife; it is rather, as Patton puts it, an attribute of the "interpenetration of bodies."[174] In terms of interactive art, as I indicated earlier, we can understand the event of interaction as the outcome of the interpenetration of the machinic system of the digital and the condition of 'userness'.

Massumi also provides us with a means to think about the event vis-à-vis everyday perception. Massumi states that in perception we register imperceptible elements of the virtual. He states, "we never just register what's actually in front of our eyes. With every sight we see imperceptible qualities, we abstractly see potential, we implicitly see a life dynamic."[175] For Massumi, just as for Whitehead, what we perceive in reality is the outcome of events, not a self-sufficient object. As Massumi states, "an object's appearance is an event full of all sorts of virtual movements."[176] This is because, for Massumi, following Whitehead, individual objects do not exist. The appearance of individual objects emerges as actual occasions form societies, which are registered by our senses. These things that are perceived can only be known as events.

Working this concept of an event through interactive digital art we can see that the outcomes of interaction are the products of many different occasions within the digital encounter. These include the occasions of the aesthetics of the interface, the coded regime of the database, the software and material bodies of interaction and their immaterial relationships. A work such as Peter Weibel and Matthias Gommel's *Flick_Ka* (2007) (fig. 17-18), which brings together various media processes, can be seen to exemplify this concept. This work, developed for ZKM's 2007 exhibition *You-ser: Century of the Consumer* and exhibited in the entrance to the exhibition, is designed to place the user, and the multiple collections of users over time, at the centre of the creative art making and art viewing experience. In this work, Weibel and Gommel set up a photo-

booth in the gallery. Standing next to this booth are screens that display the photographs taken by the machine, which are stored in a database and are also uploaded onto the Internet. In addition to this a large format projection displays each of the portraits with alternating intervals of one second, located in the ZKM's permanent collection. Visitors to the gallery are invited to enter the photo booth, to have their photograph taken and archived along with other visitors and to become an element in the artwork. Through its emphasis on the archiving and re-presentation of past occasions, its use of multiple media elements and its distribution over a network, the work embodies the idea of an event as the interpenetration of various occasions and processes. The media occasions such as the photobooth, the television screens, and the Internet work with one another, each providing conditions for what the work can achieve and the aesthetics of the work.

Figure 17.
Peter Weibel and Matthias Gommel, *Flick_Ka* (detail), 2007

Figure 18.
Flick_Ka, installation view, ZKM Karlsruhe

The process initiated by the digital encounter with *Flick_Ka* is a process of information flows. A photograph is taken of one user, reflecting one particular occasion of information flow. This is the occasion when the image of the user is recorded by the camera, digitised and visualised upon the screens and distributed over the Internet. These are the occasions in which the image of the user is mediated into an occasion of 'userness'. The process of mediation has generated a particular occasion of 'userness'; it has put the image of one user in relation with a collection of other users, reproducing the

image of one user within a collective of other images. As stated in the introduction, mediation, as understood here, is a process that generates particular objects. It is not that the act of mediation simply grasps an outside user and alters this appearance somehow, although this may happen. Rather, objects are internal to mediation. The occasion of the user and the occasion of the media operate together in the process of mediation; here, the user is conditioned by this process. We can see this rather simply here as she must step inside the photobooth, sit on the laminated bench, pull the curtain for privacy, stare at the camera that is in claustrophobic proximity and go through the agonising wait for the camera to flash. This process alters the occasion of a user, as it conditions or directs this occasion. A particular type of photograph is outputted from this experience, which would have been markedly different in a different media environment. This is a simple and concrete example of the conditionings that occur in the digital encounter, here seen in physical examples. Moving on from this we will see in Chapter 4 examples that are much more complex and take into account relationship formed between physical and digital processes.

The actual object or infrastructure of *Flick_Ka,* as a collection of pieces of technology that the artists have either designed themselves or appropriated, acts as a particular media *situation*. Its role is to capture, archive and re-condition or re-present the past. The artwork here, rather than being an object that a user or viewer observes is a *situation*. The object is replaced by a situation in which the viewer becomes a participant; importantly this is to be thought of as an occasion amongst other media occasions. And further, this is an occasion, as with all media occasions that is constituted through process.

We can also see an event of media convergence in *Flick_Ka*. The technics related to the various media that are assembled in the work create a particular mediation of reality which directs our understanding of both the tradition of portraiture, the traditional artworld separation of artist and audience, and above all for my concerns, time. This comes about due to the 'interpenetration', to use Patton's term, of the photo-booth, the screens, the database, the gallery and the Internet. There are a set of technics and traditions that direct the way in which we operate in and understand the various media

elements and situations embedded in *Flick_Ka.* In the work we come into contact with the fairly outdated technology of the photo-booth that surrounds us in shopping malls, the small screens assembled in the gallery referencing television screens, the database of images, the art gallery, and the Internet. The last two of these elements within the ecology act as media situations that direct the way in which we interact with the work. The former elements direct the way in which the work captures and mediates information. In this convergence, as already pointed out, all elements extend over one another and it is this extension that gives the character to the particular ecology. The work's function and limits are set as the separate occasions of the photo-booth, the screens, and the database extend over one another in one event. *Flick_Ka* is thus not an aesthetic object per se, but rather an aesthetic event that is an attribute of the 'interpenetration' of particular media situations and the condition of 'userness'.

2.3 Gilles Deleuze's Time/Henri Bergson's Time

Throughout texts such as *Matter and Memory, Creative Evolution* and *Duration and Simultaneity,* Bergson builds a philosophy that presents the relationship between the virtual and actual, or as he puts it, the spirit and matter, within duration. Deleuze uses these texts, along with others, to develop a frame through which the consequences of a contemporaneous virtual past and actual present can come to be understood. Thus, in order to understand Deleuze's time we must first understand what Deleuze reads in Bergson's time. In the coming chapters I will use Deleuze's work on this type of time to investigate the unique temporality of interaction with digital media. Namely, I will investigate the carrying forward of the past into the present moment of interaction and also the immanence of the future to this same moment.

Bergson's position on time came to light most famously in his ongoing disagreements with Einstein's scientific explanation of time. On the one hand Bergson promoted the philosophy of intuition and on the other Einstein promoted the precision of scientific knowledge. Bergson proposed time be viewed as a durative passage that can only be experienced intuitively. In opposition, Einstein submerged time into a comprehensive space-time structure. Einstein's theory postulated time as relative and dependant upon

movement through space, whereas Bergson proposed that time be viewed as ontological, resisting analysis through a juxtaposition of its elements.[177] Einstein's theory in essence spatialises time into moments of eternal presents plotted along a timeline. In Einstein's concept of time movement can be divided into 'snapshots' of succession, outside any notion of duration. Bergson argues against this approach, asserting that Einstein's theory creates an illusion of duration that freezes its elements into atemporal zones. For Bergson, real time or duration cannot be understood through Einstein's method, which spatialised time into an infinity of immobile points of present.[178] For Bergson, duration is not found in immobile points; rather duration is the traversing of these immobile points. To see duration, following Bergson, one must not place oneself in the "…immobile to watch for the moving reality as it passes";[179] rather one should be positioning oneself "back into the moving reality to traverse with it the immobile positions."[180] This would be to place oneself into Whitehead's flux, into the nexus of actual entities rather than the space of substance.

Bergson privileges intuition as a "sympathy by which one is transported into the interior of an object in order to coincide with what there is unique and consequently inexpressible in it."[181] This approach operates via mobility, whereas Einstein's analysis operates via immobility; the *element* of Einstein's analysis is invariable. For Bergson, in contrast to Einstein and in agreement with Whitehead, the *real*, as comprehended through the intuition of duration, is variable through time.[182] For both Bergson and Whitehead the *real* is linked to process.

As matter changes at every moment, following Whitehead, one must take into account duration. When this is done objects are viewed in a perpetual state of becoming and reality is viewed as mobile, in which, as Bergson states, "there do not exist things made but things in the making."[183] Within this conception of time there do not exist events that begin and end but rather events 'dovetail' into one another, as "a continuity of flow…a succession of states each one of which announces what follows and contains what precedes."[184]

The core of Bergson's philosophy is the intuition of duration.[185] Bergson's notion of duration is that of a unified temporal whole, resisting the idea of discrete moments of time. For Bergson duration flows, and as such is unable to be meaningfully compartmentalised into sections of present.[186] From this notion we can see that the past must necessarily contain traces of the present and that the present must also contain traces of the future. As Bergson states "what I call my present has a foot in my past and another in my future."[187] In this respect, Bergson's philosophy of duration can be thought of in concert with Whitehead's philosophy of actual entities, forming a nexus and extending over one another. I will bring this concept to bear on interactive aesthetics and media art throughout this thesis by viewing the digital and the material events of interaction as an ongoing process in which novel experiences emerge. As the two intensive systems commingle the events that are enacted by the interactive relationship 'dovetail' into one another. Here neither system can be substantiated without reference to the other. In essence this is a temporalising relationship; the human user is temporalised by the digital process as her actions become transposed into the digital. In turn, the digital system is temporalised by the materiality of human actions as the digital occasions generated by the system are experienced in lived time.

For Bergson, the fact that all experience is temporal directly relates to the way that experience, process and reality is understood. For Bergson the process that activates time makes the present virtual as it passes into the past.[188] In sympathy with this, a particular virtuality is made actual as the virtual future moves into the actual present. In other words, the actual present passes into a virtual past and at the same time the actual present is filled by a potential future event. Time is a passing from virtuality to actuality to virtuality. In this process, the past is again actualised as a memory-image, a recollection that completes the present moment. This memory-image thus acts within the present in order to constitute an experience of reality. Bergson states, "perception is never a mere contact of the mind with the object present; it is impregnated with memory-images which complete it as they interpret it."[189] Thus perception, and in general, the sensory actions of a human, becomes temporal as they tap into the virtual; sensory actions are a process that forms an assemblage of memory-images. Extrapolating from Bergson I propose that the

interactive relationship with a digital system is never constituted solely by the present act of manipulating an interface. The relationship is rather constituted by the lingering affect of the past in the present, felt as both Bergson's memory-images and also as the digital and physical occasions of interaction extend over one another. The present moment of interaction is thus constituted by both memory-images as well as the software and hardware processes embedded in the digital encounter. The human user is thus temporal in regards to her sensory activities but also temporalised as she comes into contact with nonlinear digital processes and the multi-temporality of database systems. This will be argued throughout the coming chapters.

Bergson progresses the concept of the memory-image toward a conception of what he terms, and what Deleuze adopts in the *Cinema* books, the *sensory-motor image*. This concept refers to the image of the body both sensing the virtual and moving within the actual; within this image, the body becomes aware of its existence as a conductor of the movement of matter. The body becomes aware of its sense of the virtual, which prompts the movement of matter, and at the same time, movement of matter within the actual, which in turn prompts sensing within the virtual.[190] When the virtual becomes actualised in a sensory-motor image the past, as a set of conditions, becomes part of the present, and a past-present circuit is formed.[191] This is the main point of the temporal theory produced by Whitehead, Bergson and Deleuze – that time is not linear. It is, as already discussed, rather a co-existence of past and future within the present. For these thinkers the flow of duration is thick with the virtualities of past and future.

In *Cinema 2* Deleuze describes the contemporaneity of the virtual and actual as the 'crystals of time'.[192] This crystal-image exists at the point at which the present passes at the same time that it is present; the present is thus present and past at once. As Deleuze states, "it is clearly necessary for it (the present) to pass on for the new present to arrive, and it is clearly necessary for it to pass at the same time as it is present, at the moment that it is present. Thus the image has to be present and past, still present and already past, at once and at the same time."[193] Deleuze thus proposes a view of duration which positions the past as not following on from the present but rather co-existing with it;

Deleuze elucidates this by citing Bergson's example of *déjà-vu* as the recollection of a past-present contemporaneous with the immediate experience of that present.[194] Within time, the experience of actual existence duplicates itself with a virtual existence. Deleuze's conceptions here allow us to think of duration as becoming thick with the actual events that occur throughout time and also their virtual counterparts. For Deleuze the virtual and the actual are two mutually exclusive yet jointly sufficient characterisations of the real.[195]

Accepting Deleuze and Bergson's contemporaneity of the virtual and the actual leads to a picture of a thick duration in which the matter of the present is pregnant with the virtualities of reality. Deleuze's reading of Bergson indicates that he discovers time as the coexistence of all levels of duration, matter being only the lowest level.[196] Both matter and the virtual exist in a duration, which goes to make up the whole.[197] Thus Deleuze, following Bergson, proposes that the virtual exists in reality; it is just that it does not open itself to conscious awareness because it does not exist in a material sense.

Deleuze's philosophy of the virtual moves past transcendental idealism, instead positing what has been described as a transcendental empiricism. Here Deleuze focuses upon the conditions that account for experience, rather than the experiences of a subject.[198] This is described as empiricism as for Deleuze the conditions and potential for experience are positioned as just as real as actual experience. For Deleuze, transcendental empiricism involves a givenness or an absolute that is beyond any consideration of the subject, human knowledge or human experience.[199] As Deleuze argues, the virtual does not resemble the actual, as an essence that the actual is yet to become; it is not a transcendental duplicate of the actual. Rather the virtual is the condition that directs actualisation.[200] Adrian Parr indicates that, "combining empiricism with transcendentalism, Deleuze insists that experience is in a state of becoming. Experience, that is, has no origin or ground, as was the case with the Kantian subject whereby the faculties of the subject not only organise but also provide the conditions of possibility for experience."[201] Some commentators on Deleuze have read this as his rejection of Kant, whilst others have read this as an extension of Kant's project.[202] For Deleuze the

conditions of possibility for experience is provided by the virtual. As such, the virtual is not an image that resembles the actual; it is not an object that the actual is yet to become. It is neither an image on the interface nor an image in the brain. The virtual is rather a condition for potential that directs actualisation.

This concept of the virtual drives Deleuze's understanding of time. For Deleuze, the actuality of the present is destroyed and made virtual once it enters the past.[203] As duration flows the set changes as one instance of matter is destroyed and made virtual, as present flows into a past, and another becomes actual, as the present's becoming future. The past is preserved in virtuality and, as Dorothea Olkowski tells us, the virtual past is called upon as it becomes useful in negotiations with the present.[204] Deleuze argues that it is not the subject that calls upon objects of memory from her consciousness, but that the virtual exists ontologically and that recollections are called upon from the plane of immanence.

The plane of immanence for images refers to an infinitity of all images, where images are embedded in their own substantiveness rather than performing or taking on any representational or transcendent functions.[205] The plane of immanence is virtual, it is provides an absolute framework of potentiality. The transcendental idealism as mentioned above, posits an outside, an above, or beyond where ideal forms exist. Instead the plane of immanence refers to an existence within, an unqualified embeddedness, from which immanent events, subjects and objects are actualised.[206] Here, as Deleuze states, the past is ontologically preserved in time as virtuality.[207] The past is not merely a memory in consciousness, although this may be how it actualises, it is also a virtuality that exists in reality. As Temenuga Trifonova states in her commentary on Deleuze, "time-images are experienced as past; however, they belong to an impersonal rather than an individual past."[208] Deleuze states "memory is not in us; it is we who move in a Being-memory, a world-memory."[209] The past exists as a virtual 'already-there' from which recollection-images are drawn, and which provide the condition of possibility for experience.[210] This is similar to Whitehead's extensive continuum, discussed previously, in which past actual entities achieve an objective immortality for ingression into the

becoming of the present actual entities. This is how Whitehead understands the shaping of the present based on the information of the past, and further, the existence of the past in the present. Whitehead's extensive continuum, as with Deleuze's plane of immanence, is an embeddedness, a non-transcendental plane that provides the potential for the becoming of actual occasions.

For Deleuze there exist two distinct flows of time, that of the present that passes into a past and that of the past that is preserved.[211] As such, the present of the past and the present of the present are both transitory and contiguous with one another. Deleuze states, "the former present cannot be represented in the present one without the present one itself being represented in that representation."[212] He illustrates this by explaining that Marcel Proust's Combray exists in *À la recherché du temps perdu* as a past that is remembered not as it was or even as it could be but as a virtual history, as a "…splendour that was never lived."[213] The hero of *À la recherché* is involved in a process of actively synthesising information from the past along with information gained from the passive synthesis of the present. Through this act of *remembering* the past whilst *living* the present, he recollects a time that was never lived but is nevertheless being re-lived as uncontrolled olfactory memory.

In this way, the virtual should be understood not as a past in relation to a present but rather as contemporary with the present. In this thesis we will see that this Deleuzian concept is enacted via digital media, in particular by the operation of a database that carries data loaded with pastness into the viewing present. In this sense, the past is changed as it is lived as a contiguous section of the present.

2.4 Toward the Multi-Temporality of the Digital Present

If we think about the presentness of the digital we think of a time made up of multiple processes and scales of the temporal. Serres, in *Conversations on Science, Culture and Time,* discusses the notion of presentness in his complex theory of time. I have already touched on this concept in the previous discussion. Serres' application of this concept leads to notions of multi-temporality in which time is understood as a fluctuation of

'turbulences'. This means that the present moment, rather than being a static point in a linear pre-existent temporal order, is a collection of unpredictable virtual events. For Serres there is not a linear flow of time, rather there is a collection of turbulences, or eddies, which flow both forward and backwards, resisting any singular linear direction.[214] We can thus say that time flows forward and eddies backward at every moment of presentness. This is similar to Bergson and Deleuze's contemporaneity of virtual pasts and futures with the actual present. For Serres presentness is this unpredictable collection of flows and eddies, which actualise specific elements from the virtual. The flows and eddies that create the turbulence of Serres' time are those same things that form the already mentioned crystals of time for Deleuze. Serres' turbulence and Deleuze's crystals are concepts in which presentness is a complex crossed structure of multiple temporal experiences rather than a point on a timeline.

Serres develops this idea from the mathematics of chaos theory. By this, he positions time as a nonlinear disorder in which the experience of presentness may contain past events regardless of how temporally distant they are from one another. This is Serres' argument in putting Lucretius in a contemporary position with today's physics.[215] Serres states,

> Time does not always flow according to a line nor according to a plan but, rather, according to an extraordinarily complex mixture…Thus, the development of history truly resembles what chaos theory describes. Once you understand this, it's not hard to accept the fact that time doesn't always develop according to a line and thus things that are very close can exist in culture, but the line makes them appear very distant from one another.[216]

Along with being inspired by the mathematics of chaos theory Serres also takes part of his theory of time from topology. Serres explains topology by describing two points on a handkerchief, when laid flat they may be far apart, but when scrunched up in his pocket these two spaces are very close. Alternatively, if the handkerchief is torn the two points may be even further apart than they were originally.[217] Serres explains that the science of nearness and rifts belongs to topology whereas the science of fixed distances belongs to metric geometry. Traditional time is allied with metric geometry whereas Serres' time, along with Whitehead's and Deleuze's time, is allied with topology.

In Serres' work he consistently draws comparisons between what is perceived to be out-of-date and contemporary events. This can be seen for instance in his linking of the explosion of the *Challenger* space shuttle to the religious sacrifice of humans by the Carthaginians. In this comparison Serres attempts to dig beneath the layers of time to a slower 'geological' scale of the temporal upon which all our historical endeavours are based and upon which several apparently temporally different cultures may be linked. Serres states that behind or beneath the revolutions that constitute modern history there flow, or percolate, slow and viscous fluxes. This would be similar to the geological make up of the planet Earth. The intermittent earthquakes on the Earth's surface are explained by a continuous and extremely slow movement of the core of heat. Thus, the Earth's shifting surface, likewise for the history of cultural revolutions, can be explained by an extremely slow movement from below.[218] The apparently violent schisms and shifts are brought about by an unrelenting and extremely slow movement.

In essence Serres is viewing time along a different, much slower, scale of the temporal in which revolutions only apparently alter cultures, which are still ultimately unchanged. For Serres events do not take place in a series but are rather, in the Deleuzian sense, folded into one another, or in the Whiteheadian sense nested within one another. Thus, to make the connections between events that are temporally unrelated in a linear sense is to reveal the folds in time, in a topological sense. This means that if the structure of time is folded, rather than set out on a line, if its topology is realised, then the *Challenger* event and the Carthagians' sacrificial practices might become contemporaneous. As such the events extend over one another.

At the heart of Serres' argument on time is his differentiation between its measurement and its nature. For Serres, the measurement of time considers a linear passing time, known in terms of seconds, minutes, hours, days and so on. In contrast, his concept of the nature of time holds that any present duration contains many other domains of temporality simultaneously. Within each point of present are nested, folded or kneaded many other domains of temporality. So within the present moment of the *Challenger* disaster is nested the events of the Carthagian sacrifice. The point is that these two

events, although positioned as distant in terms of the measurement of time, are for Serres contemporary in terms of the nature of time.

Christopher Witmore, working through an archaeological framework, draws upon Serres' notion of nonlinear time in order to propose an archaeology of multi-temporal history. This history would account for the various mediations of time throughout both history and historiography. He argues that in order to advance the field of archaeology practitioners in the field need to move beyond a modernist temporal model. Witmore states that, in his non-modernist time, "entities and events quite distant in a linear temporality are proximate through their simultaneous entanglement and percolation."[219] He also goes on to point out that archaeological time is a folded nonlinear temporality. He states, "archaeological time is the entanglement, the intermingling, the chiasm of pasts and presents."[220] I will build on Witmore's concept in order to propose the interaction with the digital, similar to archaeological time, as a process in which multiple temporalities are entangled. The events of the digital encounter are events in which separate information or occasions percolate.

Serres explains that the relationship between objects is a specifically temporal relation, but not one that maintains the temporal distance associated with points on a timeline. For Serres, as for Whitehead, every object, or in Whitehead's terms, every actual occasion, is interactively defined by its temporal relationships to other entities.[221] In other words, the event of presentness is constituted by the multi-temporal and multi-linear relationships formed between actual entities; these entities achieve a contemporaneity through the chaotic structure of time, not the traditional linear concept of time. This is the turbulence of the present that Serres speaks of. Through the framework established first by Whitehead, Deleuze and Bergson and now in concert with Serres I am able to examine the digital encounter produced via interactive media art as a site that generates connections between independent and diverse temporal information.

When interacting with a database or within a network of information the 'user' makes manifest Serres' turbulences. As any piece of data is accessed, the specific occasion that

the piece of data reflects is enacted in the present. In essence, the user accesses a previous section of presentness and brings this section of past-presentness into the present. This will be explored throughout Chapter 6, which describes how the archiving of the database generates a temporality that is thick with past events re-presented in the present. The turbulence of presentness is further illustrated in the digital as the structures of time become thick with the potentiality of digital media to create links – across networks, or through the software, or within the database – with multiple other types of information. This inflates the virtual out-of-field with which any digital image may link. This potential of the digital, as a condition for becoming, will be examined in Chapter 4. When time is experienced in relation to the hierarchical structuring of the database and the potentiality of digital interactivity, any notion of a linear flow of time is supplanted by a concept in which time is thick with multiples layers of temporality.

2.5 Moving Sideways Through Time

Following Serres, Whitehead and Deleuze, time may become multi-temporal as each present moment contains multiple elements from the virtual as well as turbulent temporal flows. The digital encounter may enable us to examine and experiment within this concept of time. In the digital encounter, as the user accesses the organisational and generative capacities of the digital, new temporal relations may become enacted. Within this relationship they may be thought as navigating sideways through time, through the time of the database, the time of the network or the time of the machine. Anna Munster advances the idea of multi-temporality by describing a specific multi-temporal exchange in relation to VR. Munster proposes that the convergence of digital and real space underlines the fact that digital time is discrepant to real time.[222] Munster proposes that in VR the user navigates through a nonlinear time-space. This can be thought of as similar to the navigation sideways through Deleuze's "sheets of past", discussed in *Cinema 2*.[223] For both Deleuze and Munster there is a contemporaneity of the virtual and the actual which manifests itself in the relationship between the present and the past. The past is to the present a field of virtuality, which opens itself to actualisation as a recollection image. In other words, the recollection image actualises the past in the present.[224] For Deleuze, we move sideways through time, navigating the sheets of past in order to actualise a

recollection image. For Munster, in terms of interaction, this occurs as the subject moves sideways through virtual time in order to navigate through a particular 'virtual world'. In both cases, the user navigates through nonlinear virtual time in order to actualise a certain image of the virtual. I build on Munster's proposition of a time that does not move 'forward' but 'sideways' to propose a thickening of duration within the digital encounter.[225] I put forward in the coming chapters that time achieves its nonlinearity and multi-temporality as it turbulently eddies forward and backward in the duration of the material world, through a complex nesting of multiple scales of the temporal. This process is made more complex as the virtual becomes enlarged through interactions with the information of the database and the generative capabilities of the digital.

The database, as an archive of events, can be thought of as a collection of different temporal information. This can be seen in a work such as Legrady's *Slippery Traces* (1995-96) (fig. 19-21). In this work the user navigates through a database of postcards. Each postcard image contains various 'hotspots', which the user targets using the mouse interface. This action enacts the software process of data retrieval, which generates new content in the form of another postcard.

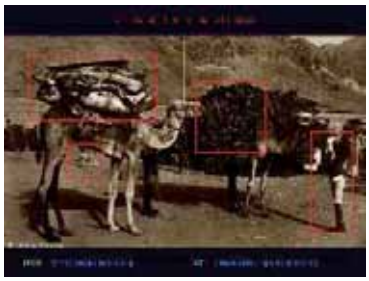

Figure 19.

Figure 20.

Figure 21.

George Legrady, *Slippery Traces* (details), 1995-96

The postcard itself is loaded with temporal information. A postcard is an object, sent from a particular location at a particular moment in time, sent in order to mark that particular time to an outside observer. It is also associated with time lags, such as the time it takes for the postcard to arrive at its destination – usually after the travellers have returned home. The postcard is a memento of the past that lingers in the present. Also, the

postcard draws our attention to the temporal distances involved in travel. As Malek Aloulla states, "travel is the essence of the postcard, and expedition is its mode. It is the fragmentary return to the mother country. It straddles two spaces: the one it represents and the one it will reach…. In the postcard there is the suggestion of complete metaphysics of uprootedness."[226] The postcard marks a particular moment in time, but is uprooted from that particular space and time as it is transported through the mail.

The postcard is also loaded with the temporal information associated with the original time that it marked. This temporal information is not something that is realised within the postcard. Rather the temporal information surrounds the postcard as virtuality. In the Deleuzian sense, the temporal information is the virtual information enfolded in the actuality of each postcard. This temporal information that marks the postcard is actualised whenever a postcard is triggered from the database. The database thus archives multiple temporal occasions. These are felt as a multi-temporality as the user navigates sideways through the database, sideways through time, in order to retrieve a postcard and consequently actualise specific temporal information.

This can also be seen in Armin Linke's *Phenotypes* (2007) (fig. 22-24). In this work the participant enters a room with a workbench and several scanners in the centre. On one wall of the installation are stacked a large number of photographs. The participant physically fingers through these stacks, and selects photographs from this large and varied selection. Some depict imagery such as sunsets, space exploration and artist run collectives, other show more traumatic scenes of poverty, isolation, and ecological disasters. There is no apparent unity between these photographs. The participant makes a selection of photographs from these images, places them on the scanner, gives their collection a title and prints out the scanned images. Linke calls this output a 'book on demand'. The participant thus takes the multiple and varied information of the collection of photographs and unites certain sections of this, creating meaning in the sense of montage. In terms of time, we can view each photograph as marking a particular time, carrying with it certain temporal information, similar to the way we viewed Legrady's postcards. When the photographs sit pilled against the wall they represent an archive of

multi-temporal information. The photographs represent the continuation of various layers of past in the present. The participant navigates sideways through this temporal information and selects specific episodes. These are then connected together (in a similar fashion to the way memory is constructed) from a multi-linear temporal structure.

AN IMAGE HAS BEEN REMOVED DUE TO COPYRIGHT RESTRICTIONS

Figure 22.
Armin Linke, *Phenotypes,* installation view at the ZKM, Karlsruhe, 2007

AN IMAGE HAS BEEN REMOVED DUE TO COPYRIGHT RESTRICTIONS

Figure 23.

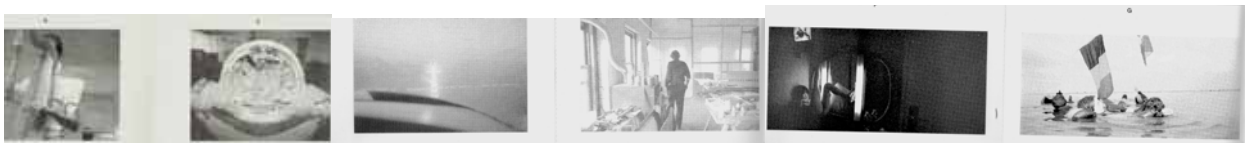

Figure 24.
Example of reconstructed photographic montage, 24th October 2007.

Just like Witmore's nonlinear archaeological time, I will argue in this thesis that the event of the digital encounter occupies a field of multi-temporality. For Witmore, as has already been pointed out, following in the wake of Serres, archaeological time manifests as the commingling, or percolation of occasions from various sections of temporality.[227] To understand history, Witmore indicates that we must first acknowledge "the complex entanglement of past and present, of materials and ideas, and of sights and sounds."[228] Tim Ingold similarly proposes a multi-temporality of landscapes. In his discussion of Pieter Bruegel the Elder's *The Harvesters* (1565) (fig. 25)*,* Ingold describes the way in which the landscape unfolds before the viewer's eyes. Ingold states that elements such as hills, valleys, paths, trees, corn and people all have different temporal rhythms.[229] Thus when presented in Bruegel's painting these elements are presented simultaneously; we

experience the landscape as a multiplicity of temporal rhythms. In this thesis I will argue that a temporal aesthetic theory of the digital should build upon these ideas of the multi-temporal. But the digital encounter does something more specific; it presents various temporal rhythms simultaneously. The time of the user, the time of the machine, the time of the software, the time of the network and the time of other users are all put in relation and are experienced as a mesh of multiple domains of the temporal. I hope to show that the negotiations of these contemporaneous rhythms constitute something like a plane of immanence for the digital; a conditioning brought about by interaction that provides the potential for the actualisation of events and a state of presentness in which the past is constantly re-presented in the present.

Figure 25.
Pieter Bruegel the Elder, *The Harvesters,* 1565

This chapter has set out the theoretical framework through which I will analyse works of interactive media art. Prior to this however, in the next chapter I look at works that would now be considered 'old media'. I do this in order to establish a media genealogy of works that experiment with experiences of time, thus connecting works in a creative historical and aesthetic sense that are not usually thought of as belonging to the same media or genealogy. In this coming chapter I attempt to put forward an argument that the condition that marks media art is a condition in which events, and thus time, become mediated, in the sense already stepped out in the introduction to this thesis. My concern with the technological mediation in which time might be differently engaged is a concern with re-

presentation. It is a concern with the making present of time differently; A concern with how media can generate a certain temporality by re-presenting the past, to literally make present again the past. I understand mediation here as a means of presenting again, presenting *through* the digital, this is not the traditional media studies understanding of mediation as either a transcendent mode of representing or a channel for signal. Instead I view mediation as a process that provides a condition for becoming; it is a generative process by which occasions are re-contextualised and re-substantialised. The character of media is marked by the possibility for novel experiences of time and history to be opened *through* mediation.

CHAPTER 3

The Time of David Claerbout, Bill Viola and Dan Graham

The past should be altered by the present as much as the present is directed by the past.

T. S. Eliot "Tradition and the Individual Talent"

For Claerbout, Viola and Graham the *re*-presentation of, and the experience of time are central to the aesthetics of their work. I say '*re*-presentation' to emphasise the artistic act of presenting again, presenting for a second time, in this case presenting *through* a technological mediation, and importantly, presenting in a way that is qualitatively different from the original. These three artists commonly use loops, feedback systems, extreme slow motion and the juxtaposition of still and moving images to disrupt our traditional conception of a linear time that flows in one direction. This chapter will discuss these temporal aesthetics of video, photography and installation art and elucidate the ways that these artists experiment with time in a sequential sense. Following on from this we will then enter into the discussion of the later chapters, which focuses on the work of digital artists who, using interactive systems, are altering the experience of time in a nonlinear and multi-temporal sense.

3.1 The Time of David Claerbout: The Past Carried into the Present

Through much of his work, Claerbout investigates and questions the classical concept of a photograph as a truthful impression of a moment in time. Through the use of both digital photography and found photographs digitised and seamlessly integrated with moving images, the once indexical space of the photographs are situated within a temporal flow, providing a background or subject for this flow. For instance, works such as *Shadow Piece* (2005) and *Sections of a Happy Moment* (2007), works to be discussed later in this chapter, show a photograph connected to the temporality suggested by a moving image and a digital aesthetic. In *Shadow Piece* a found photograph of the interior of a foyer is added to by the moving image of passers-by outside its doors and in *Sections of a Happy Moment* a multitude of still photographs taking the same subject from

different perspectives are juxtaposed in a temporal montage. In a sense, in both these works, the photographs that have captured past events and re-presented them as static, frozen moments of time, are resituated within the fluidity of time. In both works, the past, remediated by the digital, continues in each section of present. The original photographed event, mediated photographically, has been abstracted from time's mobility. The event is then remediated by the digital and brought into contact with temporal events. The photographic event is thus resituated *in* time's mobility via the digital.

Roland Barthes work in *Camera Lucida* may shed some light on the temporalisation of the photograph that we see in Claerbout's work. In this text Barthes seeks to understand the photographic image and its relationship to time by investigating its aesthetics in terms of a dual relation between what he terms the *studium* and the *punctum*. The studium that Barthes highlights is that part of the photograph which creates a general feeling of interest. The studium has to do with taste; it involves the viewer searching through the presentational quality of the photograph in order to discover elements of rational interest.[230] For instance when Barthes views William Klein's photograph *Mayday, Moscow 1959* he learns how Russians dressed in 1959, something he did not know previously and something that he is interested in knowing. This is an element that he has searched for in the photograph. On the other side is the punctum, that element which pricks the viewer's interest, though not through rational or considered means. The punctum is to be thought of as the element within the photograph that punctuates vision.[231] Rather than the viewer searching the photograph for it, the punctum rises from the scene of vision.[232] In Barthes' early analysis of the punctum he explains the way in which it prompts memory, or as Deleuze would put it, the actualisation of memory-images. The punctum, as a small, perhaps trivial detail in the image spurs recollections.[233] In this sense the punctum is similar to Proust's tea and Madeleine cake. The punctum is unfolded from the photograph as it comes into contact with a particular viewer. It creates a blind field, or what Deleuze would term an out-of-field, a world of which it is a part.[234] It is here that Barthes begins to develop the punctum into a temporal agent; the punctum gives the photograph a temporal character, it situates it in memory. [235] To illustrate this

Barthes gives the example of a photograph of Queen Victoria on horseback as an example. He states:

> "she is on horseback, her skirt suitably draping the entire animal (this is the historical interest, the *studium*); but beside her, attracting my eyes, a kilted groom holds the horse's bridle: this is the *punctum*; for even if I do not know just what the social status of the Scotsman may be, I can see his function clearly: to supervise the horse's behaviour: what if the horse suddenly began to rear? What would happen to the Queen's skirt *i.e. her majesty?*[236]

The punctum may thus be a particular fashion, a routine or other characteristic, which makes Barthes think of the past of the photograph and also creates a future for the subject photographed.

Barthes re-evaluates the idea of the punctum in Part 2 of *Camera Lucida*. Here the punctum is presented as time. The punctum is no longer about form or subject matter but is now intensive – immanent to the event of photography itself. The punctum is that which simultaneously draws attention to the past of the taking of the photograph and the present in which it is viewed; the past and the present come together along with all those events that have taken place between the present of the photograph being taken and the present of its viewing.[237] In the Deleuzian sense, at this point the events crystallise the image in the viewing present.[238] All these events are enfolded in the punctum of the photograph. For instance, when Barthes looks at a picture of his mother, two girls watching a primitive airplane pass above their village, or the assassin Lewis Payne awaiting his execution, he becomes aware that these people will die and are already dead. Barthes sees here a dual temporal quality of the photograph, which is experienced simultaneously. Barthes is transplanted into the past of the photograph, knowing that the subject will die, but also aware of the presentness of his viewing, he is aware that the subject is already dead. This is a simultaneous experience of "*this will be* and *this has been*."[239] In this respect Barthes' punctum is the carrying forward of the past into the viewing present, such that this past can be experienced anew. Perhaps, as we will see in this chapter, the movement that Claerbout introduces into once seemingly static photographs unfolds this movement that the punctum composes. The remediation and

digitisation of the once analogue photographs unfold the temporality that is enfolded in the original photograph; perhaps Claerbout's subtle practice of technological mediation can be seen to tease out the latent nesting of time that is the event of the photograph.

For instance, in Claerbout's *Sections of a Happy Moment* (fig. 26-28), a work that presents a family standing in a relatively deserted sunlight square, the *punctum* is produced by the elements of the photograph that are not seen. When viewing the still photograph, we ask ourselves: what came before this event? Who are these people and how did they come to be here? And what is to come after this event? The *punctum* thus resists the idea of a photograph as one discrete moment in time, but rather situates the events *in* time, and prompts us to think about other events, outside of the photograph's temporal frame.

This temporality of the photograph, as Massumi explains, is the residue of the photographic semblance. As Massumi points out the punctum for Barthes is an "…affective force that makes the photograph breathe with a feeling of life."[240] But the punctum is not life: it is closer to a life that continues after death, "the uncanny sensation of a lived quality of a perished life surviving that life."[241] As Massumi points out the punctum should be thought of as "…not about the content of the life per se, or about psychological associations, a memento of it might arouse in the observer, it's not really even about grief. It's about the affective commotion of a direct, immediate, uncanny thinking-feeling of the dynamic quality of a life no more."[242] In other words, the punctum of the photograph, which Claerbout unfolds with the subtle yet detectable motion that he introduces to found photographs, is a felt thought which conveys with it an affective sense of an afterlife of the photographed event.

For instance, in *Sections of a Happy Moment* Claerbout presents several photographs that have been shot instantaneously from multiple perspectives. Young children in a playground play a game of catch while adults look on. The family is set within a large sunlit square, surrounded by the generic modernist architecture of social housing. The

photograph captures this event, freezing its motion, highlighted by the ball hanging in mid air; it is, as the title suggests, a section of a past moment, frozen in time.

Figure 26.

Figure 27.

Figure 28.
David Claerbout, *Sections of a Happy Moment* (stills), 2007

In this work the temporal is felt as the image is presented not as singular photographs but as a temporal montage, combining close-ups, shots taken from the windows of the buildings and aerial perspectives. This gives the impression that although the happy moment is past, frozen in time it nonetheless continues to move through time. Here Barthes' punctum is realised as the static photograph not only retains but enacts its temporalisation. In other words, the work presents a temporally static image but transports this via the time of the temporal montage; the event in a sense is out of time in that no change takes place, but it is situated in time through the means of its presentation. This allows the viewer to inspect the static event removed from linear time, looped in duration.

The punctum is reflected in various compositional elements of the photograph. There are passers-by who are walking out of frame, suggesting a life outside the photograph. There is a shadow cast by a passer-by who stands just beyond the framing of one shot and then there are the very long shadows cast by all the figures, which suggests the setting sun and the passage of time. The ball hanging in mid-air is perhaps the most obvious, making clear that this moment is a frozen section of time. The ball hanging in mid air signals a short section of past that is unavoidably fleeting: the ball will of course drop. Here it is obvious that we are witnessing a point in time that has passed, the ball obviously is no longer hanging in mid air, just as, perhaps, the family is no longer constitutive of this 'happy moment'.

Prior to Claerbout, the film maker Chris Marker had famously employed the technique of the temporal montage of photographic images. In Marker's film *La Jetée* (1962) (fig. 29) a story of time travel post-World War III is told through the temporal montage of photographs. The difference between this and Claerbout's work however, is that, for Claerbout the photographs are not composed as a narrative. We see only one moment in time but we inspect this moment from different vantage points over time. It is as though one moment has been frozen in order for us to contemplate the disparate occasions, such as passers by, light conditions and the actions of the children, which have combined to create the moment, or the event, in time. This is also true for Marker's film. The viewer of *La Jetée* is prompted to inspect each image within the temporal montage, to understand each frozen section of present as a meaningful occasion within a larger event.

Figure 29.
Chris Marker, *La Jetée* (still), 1962

In this work Marker, both through the work's form and its content, opposes the idea of time as a forward trajectory of movement. In the form, the present is extended as it is framed and displayed by the still photograph. This seems to stretch out each instant of present such that no movement occurs; we only witness one frame, which reflects one section of presentness, without any illusion of movement. We are thus presented with a section of present that has become elongated in such a way that infiltrates not only the viewing present but also the viewing past. Here the present becomes past. As we view the same unchanging image for several seconds, we witness the image that seeks to illustrate presentness move from our viewing present to our viewing past, filling our immediate viewing present and past with one static frame.

In the content of the film, following the form, the carrying of an image of the past into the present is also a central theme. Any notion of linear time is rendered meaningless by the possibility of time travel. In the film we see the memory images of the hero as a boy witnessing his own death, in the future. The film begins at Orlay airport, where a young boy witnesses the death of a man. It is not until the end of the film that we discover that the man and the boy are past and future versions of one another. We thus see the past and the future in one image of presentness. Both Marker and Claerbout *extend* presentness, refuting an impression of time as a neatly linear sequence of presents. This may be what leads Rosalind Kraus to assert that the film is "told through the form of memory images, each of them understood as grasped from the flow of time and slowed to a stop."[243] Presentness becomes an accumulation of past images, like the rings on the sequoia tree in *La Jetée,* extended into the present. The still photographs initiate an extension of past over present, the past moment, presented in the photographic image, extends into the present, past its usual temporal limit.

As already mentioned the major difference between Marker's and Claerbout's work is that each event of presentness in *La Jetée* is situated into a narrative flow whereas the viewer of *Section of a Happy Moment* is stuck in this frozen slice of the present, continuously looping and never linking up with other narrative images. In Marker's work presentness is

composed of a particular moment of past which extends into the present and links with a sequence of still photographs. These links, along with the voice-over create the film's narrative. In contrast, Claerbout's images, which present a moment of the past, merely link up with different versions of themselves. Marker presents time as a flow of events, eddying backward and forward in a turbulent temporality, whereas Claerbout presents the past as the ceaseless repetition of an event in the present.

In another work, *Shadow Piece* (fig. 30), Claerbout uses a found photograph of a modern entrance hall, perhaps to a gallery or office building. A steady stream of passers-by attempt to gain access to this static space only to find the doors locked. The only indication of the passers-by affecting the space is the shadow they cast onto the space. Seemingly the found photograph and the moving image of the passers-by exist in the one space but in different times. Outside the doors of the modern building, time passes, people move about and the light changes, but inside the doors, time, as exemplified by the distinct stillness, does not move. In both *Shadow Piece* and *Sections of a Happy Moment* Claerbout uses the unchanging light conditions in the photographs to emphasise the freezing of a duration, what Whitehead refers to as the passage of nature, whilst juxtaposing this with the temporality of the viewing present, exemplified by the moving images in *Shadow Piece* and the temporal montage of *Sections of a Happy Moment*. Once again we see Barthes' punctum in operation. The presentness of viewing time is juxtaposed with the section of duration preserved by the static photograph.

Figure 30.
David Claerbout, *Shadow Piece* (still), 2005

Valerie De Costa describes Claerbout's work as providing a re-presentation of time that dilates slowly, similar to Andy Warhol's *Empire* (1964) and *Sleep* (1963).[244] The difference, as De Costa points out, is that whereas Warhol's films in their long duration communicate an absence of a 'subject', Claerbout's films fill this absence with a subtle presence.[245] This presence is the subtle movement that communicates a detectable process of life throughout the passing of time. An example of this can be seen in the slowly moving leaves in the otherwise still photograph of small children planting saplings in *Kindergarten Antonio Sant'Elia, 1932* (1998) (fig. 31). This work is based on a found photograph depicting children planting trees for the development of a Kindergarten in Como, Italy. Claerbout subtly manipulates only the saplings, originally bare, providing leaf cover and setting this in motion. This slow movement alludes to the movement of the wind and the passage of time. This is in contrast to the stillness of the children and the other aspects of the environment. Reality and time are thus juxtaposed with the representative and static nature of the photograph. In other words, within the photographic re-presentation of the past is the subtle suggestion of a passing time. Once again Barthes' punctum emerges as the carrying of the past into the viewing present. As Stephen Berg points out, in this work "…the past of the photographic image appears by means of movement to be loaded with presentness."[246] Thus, through the allusion that movement makes to the concept of time, the pastness of the photograph, in this case the documentation of the children, achieves a contemporaneity with our viewing present. We can bring Serres' concept of presentness to bear on Claerbout's work here, and suggest that the viewing experience of this work reflects the multiple temporal events that are folded into the present. The pastness of the image, as illustrated by the image of the children, taken in 1932, that have grown old and have now most likely passed away, is brought into contemporaneousness with our experience in the present.

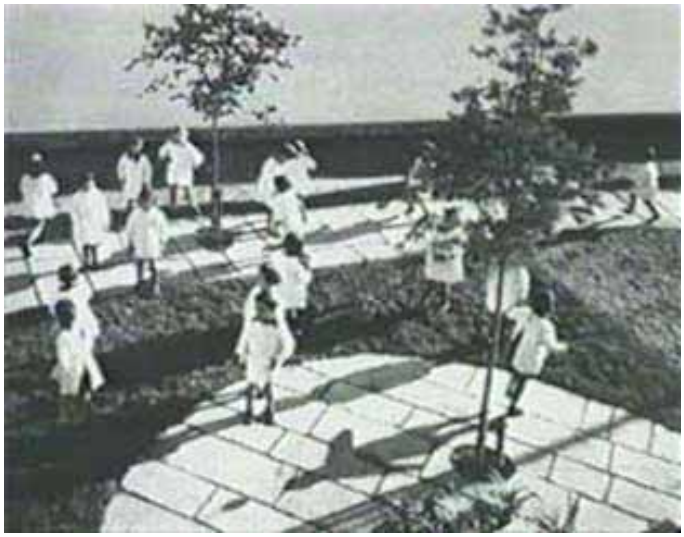

Figure 31.
David Claerbout, Kindergarten Antonio Sant'Elia, 1932 (still), 1998

The theme of juxtaposing the passage of nature with elements that are thought to be outside time is also seen in Claerbout's *Bordeaux Piece* (2004) (fig. 32-34). In this work a ten-minute narrative seems to loop continuously whilst time moves forward throughout the hours of a day. The narrative of this work, vaguely based on Godard's *Le Mépris,* set within a Rem Koolhaas designed villa in Bordeaux, deals with the betrayal felt as a young man's girlfriend enters into a love affair with his father. Although this theme is emotionally charged, it becomes trivial when set within the larger scope of the work. This narrative is played out and re-filmed over a thirteen-hour duration, the only indication of the passing of time being the gradually changing light conditions. The characters, in a sense, re-live this narrative event repeatedly, slightly different each time, throughout the passage of the day.

Figure 32.

Figure 33.

David Claerbout, *Bordeaux Piece* (stills), 2004

The narrative of *Bordeaux Piece* might be understood via Whitehead's concept of nested durations, described in the previous chapter. The ten-minute narrative is nested within the larger thirteen-hour duration of the entire work. Further, within the ten-minute narrative are nested smaller narrative events and within these events are nested other events of shorter durations. We can relate this to Whitehead's notion of duration. Whitehead states that durations can be infinitely large or small, and that they are nested within one another, like Russian Dolls, but with no largest or smallest doll.[247] These durations, or events, are enfolded within each other. DeLanda echoes these sentiments stating "…time is scalar, the present may be longer or shorter, temporally, for different oscillators (atoms and stars). The length of the present is relative, but these relative presents are nested inside one another, shorter nested inside longer."[248] Inside the duration of a day is nested the duration of an hour, a minute, a second, a nanosecond and so on.

Figure 34.
David Claerbout, *Bordeaux Piece* (still), 2004

Throughout the repetition of the narrative the theme of the work becomes less centred on the characters and the events that they act out and more sharply focused on the passage of time in which the narrative events are nested. The experience of watching the work shifts from that of viewing a short film from which meaning rapidly emerges via narrative devices to that of experiencing the passage of time and changing light conditions.

There is an obvious link here between Claerbout's practice and Claude Monet's *Haystacks* (1890-91) (fig. 35 and 36) and *Rouen Cathedral* series (1894) (fig. 37 and 38). In Monet's paintings the same subject is painted repeatedly in varying atmospheric conditions. In these works, as with Claerbout, the passage of time, as represented by the changing conditions around a seemingly static object, attests to the process of nature.

Figure 35.
Claude Monet, *Haystacks (End of Summer),* 1890-91

Figure 36.
Claude Monet, *Haystacks (Sunset, Snow Effect),* 1890-91

Figure 37.
Claude Monet, *The Rouen Cathedral (Full Sunlight),* 1893-94

Figure 38.
Claude Monet, *The Rouen Cathedral (the West Portal, Dull Weather),* 1892-94

The passing of time, or the passage of nature, or the process in which every actual entity is constituted, and the way that this passage is felt, is the central and common aesthetic feature of Claerbout's work. In *Bordeaux Piece* narrative time is represented as capturing a moment in time, similar to the photograph in *Shadow Piece*. It is evident that this captured time is inescapably passing. It in essence is past, but we see this pastness repeated in the present.[249] This fleeting moment is repeated throughout Claerbout's work;

it is given an illusion of permanence. It is an occasion that is remade at each durational moment in the works. The repetition of the past that Claerbout re-presents is subsequently juxtaposed with the viewing present. The accumulation of the past seen in Claerbout's work thus inflates the viewing present. As a consequence the passing of actual time is brought repeatedly into the temporal present.

3.2 The Time of Bill Viola: Time Slowed and Interstices Filled

Viola indicates that the driving concern of his artistic practice is the exploration of emotions and the investigation of spirituality.[250] In order to achieve this he makes clear the difference between physical reality and that which is re-presented in his works. For Viola, using the medium of video – earlier analogue, now digital– reality is not constituted by the elements that are captured by the medium, rather the medium is used in order to translate the emotional affect of this reality. Looking at these artistic drives from the perspective of temporal aesthetics we can see that Viola does not seek to re-present time as experienced in our day to day lives but rather to re-present time in such a way that allows it to be affectively felt. This is achieved by re-presenting time in a way that amplifies the everyday nature of temporal events and makes us aware of their significance at every instant of duration. As Michael Duncan points out, "sensory perception is for Viola a spiritual activity, one that leads to a heightened awareness of both nature and culture."[251] Sensory perception, and following on from this, the felt passing of time, is mediated in his works in order to convey a differentiated experience of perception. This mediation of a moving reality, in order that affect may be felt more intimately and that the qualities of this affect elucidated, commonly involves the extension of duration and the re-presentation of several versions of temporal experiences. Time is extended so that we may experience the sensory events that take place within this process at a heightened level. By extending time Viola makes accessible emotionally and meaningfully charged momentary events that, due to the speed at which time passes, are not usually registered cognitively. By slowing down time, these usually transitory events may be meaningfully experienced, inhabited and felt in viewing time.

This slowing down of time may give cognition a chance to catch up with affect. As Massumi states in *Parables for the Virtual*, affect is registered prior to the consciousness of the affect. Massumi points out that the body's galvanic responses, such as registering an electric pulse delivered through the skin, shows that the brain registers sensation before it has a 'thought' about it.[252] In fact, the conscious thought may come up to half a second after sensory and affective registration.[253] Massumi states, "stimulation turns inward, is folded into the body, except that there is no inside for it to be in, because the body is radically open, absorbing impulses quicker than they can be perceived, and because the entire vibratory event is unconscious, out of mind."[254] As Viola slows time in works such as *The Greeting* (1995) (fig. 43-44) and *The Quintet of the Astonished* (2000) (fig. 45), works discussed later in this chapter, he provides the opportunity for our cognition of the aesthetic event to catch up to our affective involvement with the occasions embedded in this event. By slowing down time Viola extends the affective moment and allows cognition to catch up to affect, to allow the brain to register the multiple impulses that the body opens itself to.

We can see an autonomy of affect at work in Viola's film *Anthem* (1983) (fig. 39-42). In this work Viola presents images of post-industrial America. These include images of factories, bridges, as well as images of nature, darkness, x-rays and open-heart surgery. The rhythm of the work is provided by the editing of these clips into dissimilar durations. The viewer watches one clip for an extended period of time, whereas some are shown for only a short period. As Caterina Maderna-Lauter points out this temporal montage, screening different images for different lengths of time, affects the reception of the work.[255] She argues that the images of the work establish a visual hymn, presenting a form of poetic narration; she positions each image as a line in the hymn working together to provide the narrative whole. Because of the rapid and erratic edits of the work, Maderna-Lauter argues that the viewer's cognition and emotions struggle to keep up with the passage of moving images.[256] In essence, we do not have time to remember these images before they are replaced by others. In other words, the speed of the transition of moving image to moving image causes the viewer to be unable to comprehend the narrativity of each image. But the moving images do seep into our experience, providing

us with an affective sense of the work.[257] The montage of images operates as the intensive unfolding of affect yet resists conceptualisation by the cognitive brain. Memory is thus enfolded in the body as affect, rather than thought in the brain. [258]

Figure 39.

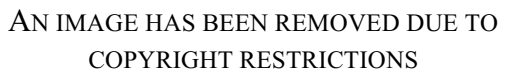

Figure 40.

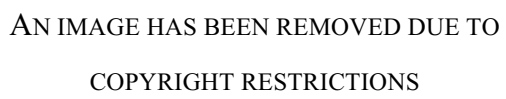

Figure 41.

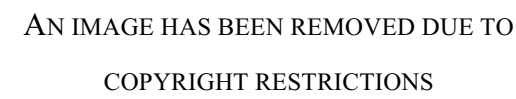

Figure 42.

Bill Viola, *Anthem* (stills), 1983

Throughout the moving images of *Anthem* a concern with the inner being of things is revealed. Viola presents images such as the sap slowly leaking from the inside of a tree, a snake making its way inside a tree, and a cantaloupe cut open to reveal the fruit's flesh and seeds. These images that represent a kind of naturalism are juxtaposed with images of the biological interior of a human, presented by footage of invasive surgical operations and x-rays. These images are further put into relation with images of the geological interior of the Earth, presented by images of mining. Adding to this concern with the interior is the fear of the unseen and unknowable. The majority of the images are ambiguous and are often obscured by darkness. Consequently, the viewer cannot easily intellectualise and comprehend the images at the level of 'meaning-making'. Also, as Maderna-Latour states, the temporal montage seems to move too quickly for the viewer to properly understand the narrativity of the images.[259] Rather they are felt affectively.

Throughout its temporal montage *Anthem* repeatedly returns to the image of a young girl in a white dress in the darkness of an underground train station. In the latter stages of the work it is revealed that the strange audio, resembling the tone of an oscillator, is provided by this girl's scream, extended in time and looped over the moving images. The underpinnings of *Anthem* are provided by the temporal extension of the scream in conjunction with the temporal montage of both banal and traumatic moving images. The moving images of the work provide the feeling of contemporaneity – the feeling of being situated *in* time – through their representation of the experiences of post-industrial America. The scenes in their familiarity link us to a particular time and place, however disturbing this link may be. Concurrently, the audio provides the feeling of being in an extended duration, of being out of the contemporaneity of real life, of being out of sync with the personal fear that is re-presented here.

The extended scream moves us away from the contemporaneity of the images; it provides the *unreal* to the montage's presentation of reality. This reveals that *Anthem* is more than a documentation of reality. Here the images of post-industrial America provide an image of everyday time whilst the unreality of the scream provides another. If we think of the scream and the moving images as transpiring along different scales of the temporal we see that *Anthem* juxtaposes these two distinct scales. The extended and looping scream, occurring over a long duration allows multiple shorter durations to nest within the longer duration of the scream. The reality of the past, present, and future, presented in the nonlinear time of the montage is juxtaposed with the seemingly unreal time that is produced by Viola's mediation of the young girl's scream.

The classical notion of the camera catching the movements of reality is again tested in *The Greeting* (1995) (fig. 43-44), in which Viola extends a forty-five second scripted event to ten minutes. Based on Pontormo's *Visitation* (1528-29), *The Greeting* represents the meeting of the Virgin Mary and her cousin Elizabeth. Elizabeth and a woman dressed in blue are in discussion, whispering to each other as Mary enters, greets Elizabeth and relates the Gospel message.

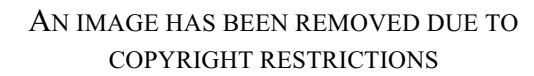

Figure 43. Figure 44.

Bill Viola, *The Greeting* (stills), 1995

The sequence of events, which took forty-five seconds to play out, is shot at three hundred frames per second and hence extended to ten minutes of playback time. This slowness embeds each event within the work with a symbolic importance. For instance, throughout the sequence, a breeze is audible and its effect on the actors' clothing is immediately visible, more so because of the extended duration. The motion of the fabric firstly references the Renaissance paintings, which Viola took as his reference point, and secondly emphasises the event as staged. The everyday reality of the wind is experienced differently as time is slowed and each momentary event is emphasised. As Jean-Christoph Amman points out, the slow motion of the work is at first experienced as an extension of time, but after repeated viewings is seen as the reality of a familiar, normal concept of time.[260] In other words, the temporality of *The Greeting* is not a concept completely abstracted from everyday lived time; it is a temporality that emerges in relation to everyday experience.

The slowness of *The Greeting* is in distinct contrast to the rapid pace of *Anthem*'s montage. This use of temporal speed has significant implications for the narrative of each work. As Katheryn Hume argues, the use of speed may move a narrative beyond a safe comprehension limit.[261] In this respect the accelerated speed of *Anthem* moves the narrative beyond the time needed to comprehend events, where the decelerated speed of *The Greeting* provides a surplus of time to comprehend events.[262] Both these techniques

cause a certain incomprehension. In the case of *Anthem,* the narrative is moved beyond a safe comprehension limit as the viewer feels as though they have missed something important due to the frenetic transition of images or they may feel as though they have missed the importance of an event that is repeated throughout the montage. In the case of *The Greeting* the viewer may be unable to understand which events are important and which events are not. Because of the slowness of usually rapid events, everything that occurs is represented as important, simply for the fact that it is afforded a great deal of narrative time. The normally fleeting facial expressions and bodily movement of the actors, their inaudible whispers, and the afore mentioned strong breeze and the sparks that are emitted from the women's touch are all central constitutive elements of the temporal composition and as such are all given consequence. The reality of the biblical event illustrated in Viola's work is thus re-presented in such a way that gives great importance to every minute detail within the larger narrative event.

Wainwright points out that due to the slowness of time in *The Greeting,* there is an emphasis on possibilities and presence. [263] There are possibilities for movement, perhaps better understood as potentialities, open at every instant of duration and also the presence of meaningful events at every instant. The slowing of time makes clear the meaningful narrative events that are compressed into every instant. There are no interstices which are not open to be 'filled' by cinematic events, in so far as there are no interstices where process does not occur.[264]

In *The Greeting* time is slowed down in order to re-potentialise the interstices that exist in traditional filmic models of representation; the interstices between the traditional twenty-four frames per second of film have been filled with visual information. This also occurs in Viola's *The Quintet of the Astonished* (2000) (fig. 45). In the interstices of traditional filmic representation events exist that we, as viewers, do not consciously recognise. These events, although unactualised, are still sensed as affect. Viola re-potentialises these interstices by extending them so that they are within our threshold for comprehension; to return to Massumi, the extension of time gives cognition a chance to catch up to affect. This is the case in Viola's *The Quintet of the Astonished.* This work, part of the *Passions*

series, for which *The Greeting* was the catalyst, once again takes its influence from Renaissance painting, specifically Hieronymus Bosch's *Christ Mocked (The Crowning with Thorns)* (c. 1490-1500). Similar to *The Greeting,* the film sequence of *The Quintet of the Astonished* is extended resulting in extreme slow motion. This, as with *The Greeting,* results in every instant of movement and change being charged with significance. The subject of this work is the processual movement of emotions, marked by the infinitesimal shifting events displayed by the movements of the actors. Immediately evident in this work is the slow emergence of changing facial expressions and the relentless process in every moment of duration. No matter how infinitesimal, emotion and subsequent movement occurs.

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Figure 45.
Bill Viola, *The Quintet of the Astonished* (still)*,* 2000

Because of the drastically slowed time of *The Quintet of the Astonished* the viewer is able to inspect the slowed body movements and facial expressions that are the consequence of the actors changing emotional states. Here there is a juxtaposition of lived viewing time and the slowed time of *The Quintet of the Astonished.* The viewer watches the events in slowed time and experiences the affect of these events in everyday time. Two levels of duration are thus presented, the slowed time of the work and the time of the viewer; both come together to constitute the event of the viewing experience.

The juxtaposition of temporalities is also visible in Viola's *The Reflecting Pool* (1977-79) (fig. 46-47). In this work Viola presents a pool in the middle of a forest. The water seems

ripple as though the surface has been disturbed. Through this rippling the pool reflects the surroundings. We hear a plane passing overhead and see a man, Viola himself, approaching the pool from a path that leads through the forest. The man takes off his shoes, steps onto the pool wall and takes a few deep breaths and leaps in. The man is then frozen in mid air as the pool, the surroundings and the atmospheric conditions, reflected in the pool's surface, continue through time. The pool also reflects two other figures walking on the pool wall that simply are not there. This is in distinct contrast to the reflection of the man in mid air, who was reflected on the water's surface as he stood on the pool wall, but whose reflection disappeared as he reached the apex of his dive. This, along with the ripples that occur for no visible reason, gives the impression that the pool continues in time, in one regime of temporality, whist the man and the surroundings are events that occur in a different temporal regime. Toward the end of the piece the man that was once frozen in mid-air and frozen in time slowly fades and vanishes. At the end of the piece, he emerges naked from the pool and leaves through the path on which he entered.

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Figure 46. Figure 47.

Bill Viola, *The Reflecting Pool* (stills), 1977-79

The time presented in this work, similar to the time presented in Claerbout's work, can be understood in terms of Whitehead's nested durations.[265] For Whitehead there is a multitude of durations in which actualities play out. For instance quantum events play out in a quantum duration, which is very small, whereas geological events play out in a geological duration, which is very large. What is important for Whitehead in explaining these scales of the temporal is that the quantum duration is nested within the geological duration. Following this type of thinking, in *The Reflecting Pool* the viewer experiences

two differentiated durational events simultaneously. In one scale of the temporal the pool exists and in another, the man frozen in mid-air and his surroundings. The notion of a single linear duration in Viola's work is supplanted by a picture of thickening duration, to include many scales of the temporal. Both the *Reflecting Pool* and *Anthem,* as it overlays moving images with the extended duration of the scream, present two different scales of the temporal simultaneously and thus nest shorter durations within longer durations. Works such as *The Greeting* and *The Quintet of the Astonished* extend duration to such an extent that each moment is re-potentialised. Here we experience two scales of the temporal as we view the work, in viewing time. The mediated time of the work, playing out in its extended duration, is put in relation to the viewing present of our own lived time.

3.3 The Time of Dan Graham: Instantaneous Displays of Linear Time

The type of temporal experimentation discussed above, which opens up new representations of time to sensory perception, is also evident in Graham's installations of the late 1970s. Installations such as *Present Continuous Past(s)* (1974) (fig. 48)*,* and *Time Delay Room* (1974-76) (fig. 49) experiment with representations of time by presenting linear time in a nonlinear fashion. In these works Graham uses surveillance techniques and time delays to presents several temporal episodes simultaneously. In these installations, Graham provides the experience of a present moment that visibly contains the events of the past. Here time is not presented as a linear flow but rather as recursive. Past events repeat, being re-presented in the present. The participant is thus involved, at any point of present, in an encounter with their immediate past. This present, which is filled with the past, moves into the past and subsequently fills the future present. There is, in this way, at any moment of the present, an interaction with the participant's cumulative past. We can view these works as precursors to the investigations of multi-temporality and differentiated spaces that I undertake in the coming chapters with respect to the database.

In *Present Continuous Past(s)* the participant enters a room with mirrored walls. The mirrors reflect the present movements of the participant. A camera mounted on the wall also records the movement of the participant and their reflection from the mirrored

surfaces. This recording is then fed into a monitor directly under the camera and in front of the viewer with an eight second delay; the delayed image is then reflected into the opposite mirror. Thus the camera catches not only the participant's present movements but also those that are presented through the monitor, subject to the eight-second delay. At any point of present there are three temporal versions of the participant. Firstly, they are in present time as they are aware of themselves as physically present in the space. Secondly, there is an image of the participant eight seconds earlier displayed on the monitor and in the reflection of the monitor in the mirror. Thirdly, there is an image of the participant sixteen seconds earlier as the reflection of the monitor in the mirror is again captured by the camera, subjected to the eight second delay, and displayed on the monitor. The result of this is that the participant sees two versions of themselves on the monitor; they see themselves standing in front of the monitor as they were eight seconds earlier and they see themselves reflected in the mirror as they were sixteen seconds earlier.

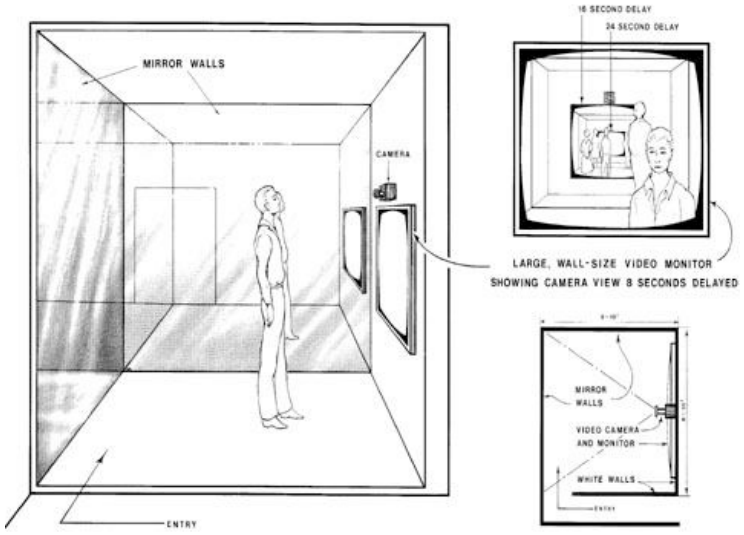

Figure 48.
Diagram of Dan Graham, *Present Continuous Past(s),* 1974 (image from *Median Kunst Netz/Media Art Net*)

In Graham's *Present Continuous Past(s)* there is the disruption of the notion of linear flowing time caused by the instantaneous display of different moments in time. In other words, the nonlinear production of a once linear time is achieved. This is achieved through the instantaneous display of those events that we commonly experience as occurring as successive moments, laid out in a linear type of time.

In this work linear time becomes thick, as we experience a past that lingers in the present.[266] A turbulent type of temporal experience is produced in *Present Continuous Past(s)* as events that usually dovetail into one another are presented side by side. In Graham's work, similar to Claerbout, a section of the past is accessible in the present; it is visibly existent in any point of present upon the monitor. The past and the present co-exist in such a way that the duration of the present becomes thick as it co-exists with the duration of the past. Time exists not as a linear succession of moments of present, but rather as nonlinear, constituted by virtual and actual events. For Deleuze, the actuality of the present takes its particular character because of the virtuality of the past and the virtuality of the future. And similarly for Whitehead, the becoming of actual occasions in the present is directed by the extensive continuum, which is wholly real but not actual. In *Present Continuous Past(s)* the virtual events of the past, or past actual occasions, are again made actual by the electronic processes of mediation and delay as these images are repeated in the present.

Graham's experiments with temporal experience are continued in *Time Delay Room* (1974-76) (fig. 49). In this closed circuit installation, he utilises two adjoining rooms, and puts the participants in both rooms under surveillance. Both rooms contain two monitors on their far walls that display the surveillance images captured by cameras mounted at the adjoining wall of the two rooms. On one of these monitors the audience in the first room is able to see the audience in the second room conveyed live in real time, on the other monitor the same image is delayed by eight seconds. In the second room one monitor displays the audience of the first room and the other monitor displays to the audience of the second room a representation of themselves, delayed once again by eight seconds.

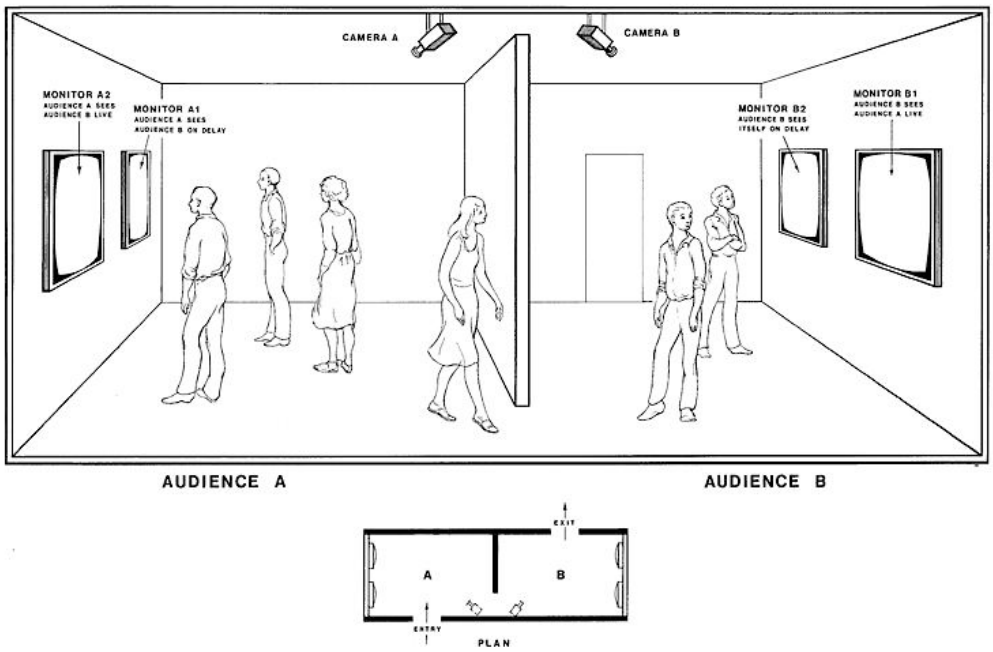

Figure 49.
Diagram of Dan Graham, *Time Delay Room,* 1974-76 (image from *Media Kunst Netz/Media Art Net*)

The recurrence of this eight-second delay in *Time Delay Room* and *Present Continuous Past(s)* is significant. Eight seconds is the outer temporal limit of neurophysiological short-term memory. This short-term memory forms an integral part of our perception and construction of images.[267] The result of the eight second delay in Graham's work is that the viewer associates their movements in the time-lagged images with their present state. Referring to Deleuze, we can see that this eight second delay is an example of the virtuality of the past affecting our reception of the present. Here, this past, residing in virtuality, is made actual upon one of the monitors. This is displayed next to the actual present that it influences. Here, as with *Present Continuous Past(s)* the viewer is exposed to an experience of temporality that subverts the usual linear sequentiality of time. The viewer experiences time as a duration that contains not just the present moment but also traces of the past, actualised via surveillance and transmission.

Also, in this work, the viewer is invested in a temporal feedback loop. This loop is set up between the modes of surveillance and the audience, where the viewer watches

themselves watching themselves watching themselves. The viewer watches the members of the other room in real time and simultaneously either watches themselves, or the members of the other room delayed by eight seconds. When the viewer watches themselves delayed by eight seconds they are involved in an event that, as has already been stated, still lingers in their neurophysiological short-term memory. In a sense, they watch an event, but can simultaneously feel the lingering experience of this event, which is then invested in the next event. The viewers watch themselves, being affected by the image they are watching, which they in turn watch again.

3.4 Towards Multi-temporality

From the exploration of Claerbout, Viola and Graham, artists that work with techniques that experiment with linear temporality, in the coming chapters I turn toward digital works that operate in a nonlinear field, which facilitates multi-temporal events.

Multi-temporality is the time that comes about through the simultaneous re-presentation of temporally disparate information. In the digital it may take the form of an archive where a user can navigate through nonlinear time, actualising information and experiencing the consequences of this in real time. As has been pointed out earlier, Del Favero, Brown, Shaw and Weibel have previously theorised and experimented with this form of multi-temporality. In "*T_Visionarium:* The Aesthetic Transcription of Televisual Databases", they describe the multi-temporal as the interactive event in which users re-compose the temporally complex information contained in a database into distinct temporal events.[268] In the coming chapters I build on this work to propose that multi-temporality, as well as the experience of recomposing nonlinear temporal information, is also constituted by the event of experiencing two modes of time simultaneously and hence producing a differentiated and thickening time. This occurs when a user experiences being *in* the time of the digital, whilst being *in* the time of the everyday. This type of multi-temporality opens itself to experience as everyday time and digital time exist side by side and differentiate the user's experience of time.

CHAPTER 4

Transactions in Time

Time is not the interior in us, but just the opposite, the interiority in which we are, in which we move, live and change.

Gilles Deleuze, *Cinema 2: The Time-Image,* p. 80

In the previous chapter, using Claerbout, Viola and Graham, I cited various examples of the way in which both 'old' and 'new' media may be used to experiment with time. In the examples of the previous chapter we begin to see the temporality inherent to the aesthetics of media art. By using the artists of the previous chapter as a lead in to my examination of the temporal aesthetics of interaction I do not mean to imply that they have in some way influenced the interactive works that I will look at in the coming chapters. In actual fact, many of the case studies that I examine pre-date Claerbout's and Viola's work. What I am asserting though is that these works have a specific commonality; in their mediation of the world, in the sense that I set out in the introduction, they are all implicitly concerned with the temporal, and further, the processes that they initiate open new modes of temporal experience. These works are thus related in a type of media genealogy or lineage. As I mentioned previously, the methodology of moving back and forth in time in terms of the case studies, diachronically tracing the emergence of particular traits of certain media within this genealogical field, marries well with the theoretical framework of this thesis. Viewing works that are decades apart as closely related in their temporal experimentation echoes the Whiteheadian and Deleuzian framework that positions time as nonlinear, complex and topological.

I have titled this chapter 'Transactions in Time' in order to frame my explanation of interactivity between human and machinic systems. As I focus this chapter on an exploration of the way that time may be experienced differently in interaction with digital artworks, the processes that the user enacts in relation to the machine are to be thought of

as *events of transaction* rather than *events of reaction*. By the term 'reaction' I refer to those events in which the user merely reacts to the machine's prompting. By the term 'transaction', in contrast, I refer to the negotiations and the interrelationship established between the user and the machine as two contemporary occasions. The phrase *events of transaction* indicates that the digital encounter is manifest as a relation between the human and the digital rather than a response that is centred on the human. At this point, interaction takes place as the user interacts with both the content and the form of multi-modal digital media; the human comes into contact with both the aesthetics of the artwork that are registered through the senses, but also the digital processes that provide the conditions for the aesthetics to emerge.[269] Human processes thus transact with digital processes. Reaction emphasises the response to these digital events, whereas transaction emphasises the mesh of the encounter. In the event of transaction the processes initiated by the user and the machine extend over one another, setting the conditions for interactive events, and it is this extension that *produces* the temporality of the interactive event. We will see examples of this throughout this chapter.

The digital encounter of interactive media art can only be thought of as an event; a concept that moves beyond ideas of aesthetic experience constituted by a disinterested 'subject' apprehending a static 'object'. The aesthetics of digital media are manifest in process; a process in which the multiple occasions of the computer, the varied occasions of a network and the occasions of a user work together.[270] This does not merely involve a user encountering and consciously responding to the computer's data. Rather the aesthetics of the digital involve a concrescence, a process in which the human and the digital come together; a process in which the user and the digital extend over one another, setting limits upon what each other can achieve. Instead of a user as an outside that merely accesses data from inside the computer, the entire interactive transaction is a process that sets the conditions for actual experience. As Adrian Mackenzie points out, this concrescence occurs as the boundaries between living and inorganic are collapsed. The living human is always potentially contaminated by the inorganic technology.[271]

4.1 The Event and *Present*

Carrying on from the previous chapter, we can see the Whiteheadian and Deleuzian event enacted in Claerbout's computer based work *Present* (2000) (fig. 50-56).[272] After accessing the *Present* website the user is given a choice of three flowers – a gerbera, an amaryllis or a rose – to download onto their computer. When the flower is downloaded and the file opened the rose, gerbera or amaryllis is seen beginning to bloom. From here the flower goes through its normal lifecycle, achieving full bloom and then beginning its decay in real time.

Figure 50.

Figure 51.

Figure 52.

David Claerbout, *Present* (Details of Amaryllis, Gerbera and Rose), 2000

In this work a set of processes of the digital are initiated which mediate temporal events and repeat the events of the past – as the flower achieving full bloom and then decaying – in the viewing present. Each time the user clicks on the flower's icon they access the flower at a specific time of day, evidenced by the changing light conditions, and at a specific point in its lifecycle. The user cannot rewind or fast-forward this lifespan, but only watch the flower in lived time, in its natural cycle.[273] After the flower has decayed, only a seed is left, which can be then sent to another user and the flower begins its lifecycle again. The seed can only be reinitiated if it arrives on a different computer, the network must operate for the life of the flower to operate. In this work the organism of the flower, its natural decay and the natural progression of time are juxtaposed with the digitality of the medium through which it is viewed and the flower's ability to loop through its lifecycle as it is 'used' by another 'user'. In this work linear temporal progress is juxtaposed with the infinite iterability of the digital system. In this work the concept of decay or entropy is being questioned in the face of digital technology and ever expanding networks. In *Present,* similar to Claerbout's other works such as *Shadow Piece* and

Sections of a Happy Moment, time is investigated via a specific medium and its temporal aesthetics.

In a Whiteheadian and Deleuzian sense, *Present* embodies the process of an event, as a "…a nexus of actual occasions, inter-related in some determinate fashion in one extensive quantum."[274] We see this event unfolding in *Present* as it combines multiple contemporary actual occasions. The occasions that take place over cyclical time that see the flower blooming and decaying are juxtaposed with the occasions that take place through the infinite recursive time of the computer. The time of the software, the lag that takes place when downloading the flower, the temporality expressed in the growth and decay of the digital flower and the temporal potential embodied in the seed as a file that can be shared with another user and 'reloaded' to begin its cycle again, all extend over one another and are thus all enfolded in the aesthetic of the work. The work is made up of these different experiences of time; the work of art here is an event, made up of a multiplicity of experiences. Importantly, the work of art is an event in which the notion of living nature, and its associated temporality, and inorganic technology are removed from their separate modalities and instead brought together.[275] Technology *supplements* the natural as it mediates it; the Internet, the computer, its software processes and visualisation and image-capture technologies attach themselves to the natural and alter, among other things, a ‘natural’ experience of time.

Figure 53.

Figure 54.

Figure 55.

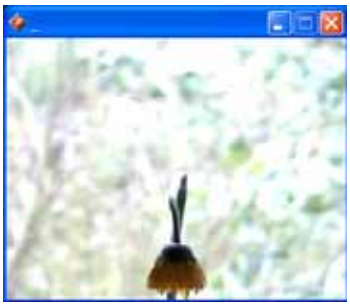

Figure 56.

David Claerbout, *Present* (Details of Gerbera throughout time), 2000

4.2 Rethinking the User

If we follow Whitehead and Deleuze and we cease viewing time as a product of our consciousness, we can instead conceptualise it as a non-psychological interiority that is simultaneously *produced by* and *encountered in* events. Following Whitehead, the process of actual entities produces time, and it is in these events that we, along with every other entity in the universe, experience time. The condition of being *in* time connects us to every other event *in* time. To exist *in* time, to be contemporaneous with the condition of time, to be temporal, is to be in connection with the environment, be it the user's or the computer's, and to be involved in the process of what Whitehead calls 'the passage of nature.'[276] In this passage process is central.

When thinking about technology through the temporal, the distinction between the way in which something is performed and the way in which something is known cannot be maintained. [277] Process and experience are implicated in one another.[278] Because the interactive event entangles the concepts of understanding and performing, the knowledge gained from this interaction cannot be separated from the performative action that provided the condition for this knowledge to emerge. As Shaviro explains, after Whitehead "it no longer makes sense to separate the theory of *how* we know from the theory of *what* we know" (Shaviro's emphases).[279]

For example in *Present* the way in which the work is performed cannot be bifurcated from the way that the work is known. The work involves many processes, including

distribution over a network, software processes, visualisation processes and user initiated processes. We are unable to know the work without enacting these processes; they form the milieu or the context in which the artwork becomes. So there is not so much a knower/known relationship between a 'user' and the computer, but rather a process of events, as the 'user's' actions are registered by the computer and used to direct computational processes and the computer's actions are sensed by the 'user' and direct physiological processes. It is this interpenetration of forcers from which the conditions of interaction emerge. These processual occasions are the conditions from which the work is produced; in other words the work is the outcome of processes, it can only be known in these processes. The work is performative and cannot be actualised without the events that take place and the relationships that are generated between actual occasions. Interaction is a process in which these contemporary occasions interpenetrate one another. In these occasions there is no 'subject' or 'user', as a discrete 'knower' apprehending reality from a privileged vantage point, rather interaction is an active involvement with changing processes.

It is because of the necessary connections formed through the process of an event that Whitehead does not talk about a 'subject' per se. A 'subject' connotes a permanent or enduring substance, a knower who contemplates the flux of nature from outside. As I have already discussed, for Whitehead this idea is flawed, the only type of 'subject' that exists is the 'subject' at one instant, as an actual entity, or more correctly if we are thinking of a human as a 'subject', as a society of actual entities. This one moment is tied to the flux of nature by the fact that the 'subject' herself is an event made up of a multiplicity of momentary actual occasions.[280] There is thus no ‘outside’ from which to view events. Any notion of a 'subject', or for that matter a 'user' – as the 'subject' position appears in so much literature on digital media – is always tied to the process of events. This is because, just like every other occasion in Whitehead's universe, the 'subject' or the 'user' is remade at each instant. The 'subject' or the 'user' is always 'becoming' based on her relationship with the process of the world.

Rather than a subject Whitehead speaks of a subject-superject. By this term he indicates that the actual entity has a dual existence. It is a subject for the one instant at which it exists, it then perishes and takes on the form of a superject, an immaterial subject that passes information on to the next actual entity. This is explained by Lawrence F. Wilmot, "…it (the actual entity) may be seen as a 'subject' with respect to its own becoming and as a 'superject' with respect to its objective immortality for ingression into another actual entity in process of becoming."[281] When we speak of a 'subject' what we are talking about is a particular condition that emerges from the process of the world. The 'subject' is not a permanent substance but rather at once a set of occasions that provide the condition for a becoming subject and also that very becoming. Hence, when we speak of a user, we are really talking about a subject that is in process and a superject that is the conditioning from which these processes emerge. When we speak of a 'user', we likewise speak of a conditioning and a becoming. The important aspect to consider here is the condition of 'userness' – a set of user-initiated processes – as a type of superject, that provide the potential for the ongoing becoming of the user in the interactive encounter.

This can be seen, for instance, in Jeffrey Shaw's *Web of Life* (fig. 57). As mentioned earlier, in this work multiple installation sites (one permanently installed at the ZKM Centre for Art and Media, Karlsruhe and four other satellite installations), are connected via the Internet.[282] Visitors to the installation scan their palm lines into the system and this information affects the aesthetics of the 3D mixed reality environment. The work embodies the notion of the condition of 'userness' as a particular conditioning that is built up as an *ingression* of user-generated occasions over time due to its distribution over multiple sites and its use of multiple user-initiated processes to trigger images. The Whiteheadian term ingression here refers to the actual entity's grasping of information from another entity over time in order to use this information in its own becoming. It is the way in which past information enters the present and the way in which past occasions may direct or influence present occasions. It is this relationship formed between two contemporary occasions that provides the conditioning for the interactive experience. In *Web of Life* there is not one individual installation site and not one individual scanner, but rather multiple sites in which information may be uploaded. Likewise, there is no

individual user, but rather multiple users spread over these multiple sites and over multiple different times. In this work the digitally generated aesthetics of the space are built up over time from several networked spaces as the machine absorbs and is directed by the condition of 'userness'.

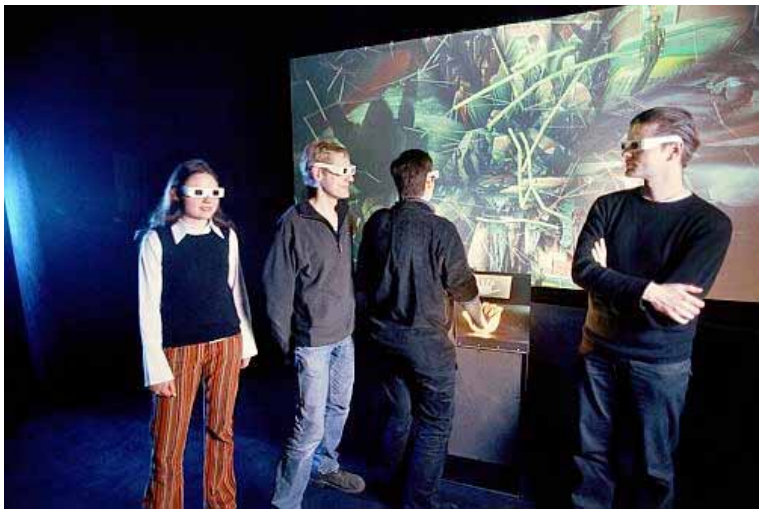

Figure 57.
Jeffrey Shaw, *Web of Life,* 2002

Furthering this, the condition of 'userness' – which emerges from the ingression of user-occasions over time – forms an interactive relationship with the occasions that are initiated by a digital system. These occasions can be thought of as contemporary occasions that prehend one another and direct one another's becoming. Approaching the interactive encounter as contemporary occasions may allow us to understand the interactive event transductively, as a process that involves a common operation between a set of internal energies or forces and the milieu or context in which these forces become.[283] The concept of transduction as I will use it comes from Gilbert Simondon via Adrian Mackenzie. It will be explained in more detail towards the end of this chapter. For now though, I would like to use the concept in a general sense, as a starting point, in order to enrich Whitehead's concept of contemporary actual occasions, as occasions that prehend each other to form an ecology or milieu that generates a particular conditioning for becoming, and then apply this to digital interaction.

Simondon's paradigmatic example of transduction is the growth of a seed crystal suspended in liquid. In this process the planes on which the crystal grows are always on the crystal's surfaces in contact with the liquid.[284] The process of individuation, or differentiation, because of this, is a process that is not initiated by the crystal alone, but rather a process of transaction with its milieu. In other words, the crystal's growth, or its becoming, takes the form that it does due to its own internal energies and potentials put into contact with the external forces of the liquid. The shape of the crystal is thus produced as a commingling of forces of potential and environmental conditionings. Simondon applies transduction here to physical growth, but we can also apply it to other aspects of life, in order to understand it as a dynamic negotiation between forces. Transduction can thus be understood as a becoming that is brought about by a differentiating exchange of energies. As Mackenzie points out, transduction is a concept that is able to grasp the way that living and non-living processes differentiate and develop. In terms of an interaction with technology, as Mackenzie states, "technologies are not a domain exterior to human bodies, but are constitutively involved in the 'bodying-forth' of limits and differences."[285] Understood transductively, interaction is a process in which the human is *supplemented* by the digital in a common operation that conditions the becomings of either entity.

This logic of transduction can be used in concert with Whitehead's theory of contemporary actual occasions to understand digital interaction. For Whitehead, the term contemporary implies that the occasions that share this contemporaneity are causally independent.[286] This is the same with Simondon, as it is not the liquid alone that causes the particular growth of the crystal, nor is it the crystal that causes the qualities of the liquid, rather there is a common operation between the two. Whitehead explains this by theorising that when two occasions occur at the same time they do not prehend one another in the same way as occasions that occur in a temporal order, which are causally dependent. In the case of the digital encounter we could think of two occasions such as a computer initiated process and a particular user initiated occasion. The computer does not cause the occasion of the user to happen nor does the user cause the occasion of the computer. The user may initiate or trigger a particular software process but they do not

cause it, in the sense that the software processes operate within pre-programmed rules. The user cannot cause the software process to be something that it is not, just as the software cannot cause the user to be something that she is not. However, the occasions of the software and the occasions of a user are connected; the user operates within the limitations, function and potentialities of the software and by the same token the software operates with the user's capacities. For instance, the user must know how to use the system, she must work within its rules, otherwise she cannot interact with the machine and the software does not actuate its potential.

The notion of contemporary actual entities can be again seen in the previous example of Shaw's *Web of Life.* The user and the machine in this work can be thought of as contemporary occasions, with the user operating within the machine's conditions. For instance, the user must know where to place her hand to scan it into the system, and cannot work with the machine outside this conditioning. In other words, she cannot manipulate the images without following the system's rules. Also, the machine works within the user's limits, registered as the condition of 'userness'. The palm lines, as a process sensed from the user, direct the generation of images. The machine's process is thus directed, but not controlled, by the conditioning of the user just as the user's process is directed, but not controlled, by the machine.

Whitehead describes this process of contemporary actual occasions by giving the example of the sense data of a chair. He states that when we become aware of the contemporary chair/object we are involved in an interaction of occasions between the chair occasion and our own experience. Whitehead states,

> We see the contemporary chair but we see it *with* our eyes; and we touch the contemporary chair, but we touch it *with* our hands (Whitehead's emphasis). Thus colours objectify the chair in one way, and objectify the eyes in another, as elements in the experience of the subject. Also touch objectifies the chair in one way, and objectifies the hands in another, as elements in the experience of the subject.[287]

From this we see that the objectification of the chair is the outcome of a nexus formed between contemporary actual occasions, those being the occasion of the chair, the

occasion of the eyes and the occasion of the hands. As Whitehead states, contemporary actual entities, such as the chair and the percipient, or in our case, the multiple actants of the digital encounter, are involved in a "unison of immediate becoming."[288] This means that the immediate present of one actual occasion, in our case the occasion of a user, is also contained with the immediate present of another occasion, in our case the occasion of the software. Both these occasions condition the way the other becomes in relation to their interaction. This argument also holds that what is important is not an individual user or an individual machine. Rather, in a Whiteheadian framework we are interested in the interrelationship formed between the *occasion* of a user and the *occasion* of the machine.

By understanding the user as an occasion, or rather a collection of occasions that provides a conditioning for interaction, I am able to get away from notions of a subject and the psychology or phenomenology of interaction. Instead this allows me to understand interactive artworks as a process in which the user and the machine form an ecology from which the artwork emerges. We can again see this taking place in Claerbout's *Present*. This work exists in order to be 'used' again and again by various 'users'. There is no individualised user here and no individual computer. The artwork is not about an individual user's experience with the individual program. Instead the work is about the network formed between multiple users and multiple computers that reactivate the lifecycle of the flower and the temporality of *Present*. In this network the condition of 'userness' is a unity of actual occasions; its becoming is based on a collective of users, or a collection of processes, that make up the event of the work. The condition of 'userness' is not one individual user on one individual computer but rather a condition of becoming that is put in process as the work is passed from one user to another.

This is also seen in Weibel and Gommel's already mentioned work *Flick_Ka* (fig. 58). The event of this work is made up by the collection and archiving of photographs from multiple 'users'. Once again, there is no individual user here as the work can be accessed and interacted with by various users either over the Internet or in the actual gallery installation. The work displays the condition of 'userness' as it archives traces of various users over time. The condition of 'userness' thus does not come from any one

individualised user but is rather a condition that is sensed by the machine over time, from multiple users. Here an individual user is not the point. One photograph indicates one user but the multiple photographs and the processes associated with the network and interaction are indicative of the condition of 'userness'. Hence the interactive event presumes this condition of 'userness', a condition that emerges over time, rather than the action of an individual user. The condition of 'userness' is made up of the user-generated actions and processes that are absorbed over time by the machine; there is thus a trace of each individual user occasion within the condition of 'userness'; it is a network or an ecology formed over time between all of the user-initiated processes sensed by the machine. In terms of interactivity, each user is an element in the becoming of unity. Each individual's action is an occasion that, when absorbed and brought together by the machine, manifests the condition of 'userness'.

Figure 58.
Peter Weibel and Matthias Gommel, *Flick_Ka* (selection of photographs), 2007

In Ulrike Gabriel's *Breath* (1992-1993) (fig. 59) we can likewise see that the interactive work depends upon the connection of user-initiated events. In this work a participant alters the oscillation of digitally generated polygons upon a large projection screen via her breathing. *Breath* uses a sensor belt as a biofeedback interface that allows participants to alter the images and the sounds of the installation space. The polygons appear to be breathing and morphing along with the user's actual breathing: the more regular the breathing the more chaotic and violent the movement upon the screen. In this work we can clearly see the supplement of the digital to the human condition. The technology is added to the human body and controlled by the user's physiology. We can think of this system as biocybernetic adaptation, a modification of a system's functionality or appearance based on the real-time measurement of the user's physiology, in this case her

breathing.[289] The work thus uses the physical movements of a user sensed over time in order to manifest a digital aesthetic. As such it absorbs the processes of a user and translates these into digital processes. Importantly, in *Breath,* similarly to *Flick_Ka,* the activity from the previous user is absorbed into the system and activated by the next user. As one user leaves the installation space the work continues breathing – appearing to sense the latent trace of the previous user – and uses this as the starting point for interaction with the next user. One event generated from a relationship formed between the system and one individual user thus overlaps another event, initiated by the relationship to another user. The condition of 'userness' is constituted by just this extension of occasions. The condition of 'userness', in terms of interactivity, is constituted not by one individual user, but by a society of occasions, which form a nexus through the machine.

AN IMAGE HAS BEEN REMOVED DUE TO COPYRIGHT RESTRICTIONS

Figure 59.
Ulrike Gabriel, *Breath,* (1992-1993)

As Munster points out this work is about asking participants to conjure digital environments by turning their bodies into performative tools.[290] The condition of 'userness' is sensed by the machine in the form of actions generated from the user, information that is registered by sensors on the belt that she wears. The user's body does not operate as the point of origin through which the digital images are generated. Rather the work is 'embodied' as a relationship is formed between the user's bodily capacities and the parameters of the technical interface and the operation of the machine's software.[291]

4.3 Interaction, the Interpenetration of Occasions and the Virtual

The process of interaction, as an interpenetration of user initiated occasions and machine generated occasions, can be further understood by enlisting Deleuze's already discussed philosophy of the virtual. At its core, the interactive process and the aesthetic event of digital art – as with any process understood through Whitehead and Deleuze – is an actualisation of elements from the virtual. Mark Hansen points out that the virtual is articulated in relation to both the time-image of cinema and also the digital image of media art. In Deleuze's time-image we see an example of the virtual/actual relationship produced by cinema's irrational cut, which fails to link one image with its counterpart in a temporal sequence.[292] This procedure, in contrast to a cinema that presents a continuity of linear series, situates the virtual out-of-field, as those things that are not present in the actual image, in relation to the actual image. This reading of the virtual can be understood in a similar fashion to the reading of Barthes' punctum that I put forward in the previous chapter. The punctum links the photographic occasion to its out-of-field, to all those occasions that occur outside of the photographed moment in time. This is similar to the way that the actual links to the virtual, and it is this relationship that substantiates the image; it is the virtual out-of-field that gives the character to every actual image.

In terms of the digital image, its potential for linking and generating other images connects each actual image to the virtual.[293] Each digital image that has the capacity to generate other digital images based upon the logic of hyperlinking reflects a potential to actualise other images directed by the virtual. Just as the cinematic time-image is connected to its virtual out-of-field, the digital image links to other images that are beyond its frame, but still part of its network. As such it is connected to a field of potential that is directed by a set of virtualities in terms of how it is programmed and/or networked. Take for instance a digital image on a web page that has the potential to link to other web pages. It is not that a digital image may link with anything or everything in a network. It must follow a particular network protocol and be set up to link with other specific network addresses. However, it may also be linked to by future unknown web

pages and so on as its network expands over time. These conditionings or parameters are the virtualities that direct the potential that may be actualised by the digital image.

This occurs for example in a work such as Legrady's *Slippery Traces* (fig. 19-21), previously mentioned in Chapter 2. The 'hot spots' internal to every digital image of *Slippery Traces* potentially links to a number of other images archived within the CDROM or dedicated installation database. Each time a user activates a 'hot spot' a process of actualisation is begun in which one image, directed by a virtual conditioning, links to another. This process of actualisation is directed by the programming of the database and the actions of a user. As the user activates a particular 'hot spot' an image is activated based on an algorithm that takes into consideration previous images that have been seen and previous events of interaction. The computer then triggers an image based on this data.[294] The software thus absorbs the condition of 'userness' and uses this in the process by which it triggers images from the database. This actualisation of the virtual can be understood in terms of Whitehead's process, in particular the becoming of actual entities. As the computer's memory of past interactive occasions, and its processing of this data, directs the actualisation of the present, we see that the present is directed by past occasions and that way that the computer 'understands' them. As such, Legrady's work is directed by the machine's internal programming, which we could perhaps think of as Whitehead's subjective form, and the information that is garnered from the condition of 'userness', which we could likewise think of as Whitehead's external datum.

Thus, the actual image of the digital, at every moment, is imbued with the potential to actualise events based on the external datum sensed by the machine and its parameters for processing and using this external datum, just as the actual entity is constituted by its subjective form and the external datum that it prehends from previous actual entities. We might think of these occasions as the virtual side to the actual event, as processes that direct an actualisation. This is the *event* of the digital encounter; a process in which the nexus formed between actual occasions, in this case the condition of 'userness' and the conditioning of the computational system, gives rise to actualisations and experience.[295]

My understanding of the virtual here involves a set of concepts or situations that condition the way in which events and occasions become. For Deleuze the virtual is the condition of the problem, it is what directs the actualisation of the present. As Shaviro points out "the virtual is the transcendental condition of all experience…The virtual is a principle of emergence, or of creation. As such it does not prefigure or predetermine the actualities that emerge from it."[296] Thus the virtual exists as the *condition* of the encounter that gives rise to interaction. This involves the *condition* of 'userness' and the *condition* of the machine. Both these conditions, as they direct the outcomes of interaction, are virtual elements that direct the actual, not in a pre-programmed sense but rather by limiting what DeLanda calls degrees of freedom.[297] For instance, in *Slippery Traces* past interactive events are remembered by the machine and used to direct the future images that it triggers. The machine thus works within a set of limits or freedoms established by the endurance of the past – in this case the data relating to previous interactive events – in the present.

Interactivity takes place in an environment that is not just constituted by actualities but also by their virtual counterparts. This becomes clear as we think about interaction as a temporal event. Experience arises from reactions to both the actual *and* the virtual in one event. As Murphie states, "life is not ultimately to be defined, but is found instead in process, specificity and plurality."[298] For Murphie, following Whitehead, life exists as an ongoing process that is impossible to tie down into a permanent, stable and definable entity such as the 'user'.

Following this line of thought, there is an important distinction between the 'user' and the condition of 'userness' that goes to the heart of my argument. The difference is that a user brings to mind conceptions of a self-contained, deliberate and conscious subject that enters into interaction with either another user or a machinic system. This once again bifurcates experience into knower/known relationships. The condition of 'userness' instead focuses on the processes of interaction that occur between the machine and the occasion of a user, not as discrete occasions but as occasions tied together in a field of relations. Here we do not think of a user as an end point of the interaction, as an entity

that initiates and controls the events of interaction. Here the condition of 'userness' is a set of actions or processes that emerge over time and in concert with the occasions of the machine, providing the condition for the overarching character of the digital encounter.

This can be seen in Ken Feingold's work *Head* (2000) (fig. 60), a realistic model of a disembodied head able to recognise and respond to human speech. In this work the participant is able to ask the robotic head questions and carry on a conversation, with varying levels of coherence. The computer runs several software applications, including commercial speech recognition software and an application that attempts to evaluate the meaning of the processed speech and formulate a reply from its database of words.[299] This database is built up by inputting texts into the database, in a sense building the machine's vocabulary of known words and sentences. In the conversation with the work the user does not completely direct the machine, rather the machine transacts with the user in unforeseen ways, as it attempts to recognise and understand the user's speech. This model of interaction provides an example of the relationship that emerges from the interaction of the condition of 'userness' with the condition of the machine. Through the use of Artificial Intelligence (AI), both the user and the technology respond to one another in a way that constructs a semi-lucid, but somewhat schizophrenic, conversation. The head responds to the questions asked of it, but not in a predetermined way; the responses are a consequence of the user's questioning and the machine's collection of vocabularies. But these responses make little sense. The user then responds to these coherent yet nonsensical utterances by asking more questions. The head is not 'used' by a 'user', rather it *responds* to the condition of 'userness' that it senses in the encounter. The condition of 'userness' and the condition of the head transact over time, as the head remembers past speech acts and uses these in the present, they prehend one another and concresce in order to produce the character of the interactive event.

Figure 60.
Ken Feingold, *Head,* 2000

Here, response emphasises a type of time in which the potential of the digital and the conditioning provided by past events are immanent in the present. As such the present of the digital encounter is imbued with potential that may become actualised dependent on the condition of 'userness' and the functioning of the machine. The conditioning of each section of duration by the condition of 'userness' and the programming of the machine – as seen in the potential reflected in the vocabularies of the database and the recognition applications that it runs – represent the potential future direction that the interaction with *Head* could take. In a sense, both the user and the head respond to one another based upon the limitations of their internal 'programming', on the one hand, and degrees of freedom set by the milieu, on the other. The machine, for instance, responds to the user based on its database of known words as its internal programming, and the data that it senses from the user's speech as its milieu. Likewise, the user responds to the head based on her own language and what the head says to her. Here the traditional distinction of subject and object is disintegrated. There are now two entities progressing through the duration of their interaction as they respond to one another. Both entities form a relationship *in* time and as such both entities change *in* time.

4.4 The Virtual and the Event

The event, or the process of becoming, marked by the process of virtual-becoming-actual, is a central tenet of my understanding of time. This has been seen in Chapter 2. Taking a Deleuzian reading of Bergson, we are provided with a definition of the concept of time in

which everything that processually occupies the present moment is to be thought of as imbued with all that may potentially transpire in the future and all that is past. These are the virtual elements of every actual event.[300] In this respect the term 'virtual' signifies the potential of the future and the traces of the past that direct the actualisation of the present moment, it is the conditioning that directs the actualisation of the present.[301] As DeLanda points out, studying the virtual not only means investigating the events that actually occurred in a system, but rather to understand the system based on the events that could also potentially have taken place, if certain circumstances had been different.[302] These circumstances must be ones that a system could either respond to or unfold in relation to: they are intensive or immanent to the system. In other words, the virtual is not anything or everything but rather is constrained and contingent upon the singularities of the system. In terms of interaction with a digital system, the virtual exists as the system's degrees of freedom, set by the interacting 'user', and the internal energies, forces or programming of the system.

For instance, in David Rokeby's *The Giver of Names* (1990-ongoing) (fig. 61-62) we can see the process of actualisation directed by the conditioning of the virtual. In this work, a user enters the installation, which is filled with various objects, such as toy cars, water pistols and other children's games. The user may select a set of these objects, or anything that they bring with them, and place it on a pedestal in front of a camera. The camera records the visual information and feeds it into the computer, which performs various levels of image processing, such as outline analysis, division into separate objects or parts, colour analysis, and texture analysis.[303] Based on the outcome of these processes, the database management software searches the database of known words and phrases whose tag is most commensurate with the output of the image analysis. A sentence or phrase is then constructed and vocalised by the computer, which does not literally give the objects names, but rather metaphorically describes the computer's experience of them.[304] The computer, of course, does not 'know' these objects, it has not experienced these objects in the sense that we as humans have. Rather it gives a description of its experience of the objects based upon the words available in its database. For instance, *The Giver of Names* describes a small yellow rubber ducky as "Semicircles, so assymetric

that ill-proportioned pears occurred to their informed bodies, can demonstrate no second edible fruits."[305] As such, the work provides a definition of the objects outside of their usual context or conditioning. Instead the system's description is based upon its own complex knowledge base and the ways in which data is transcoded into this base via various forms of analysis, tagging and matching. This conditioning, in line with Deleuze's notion of the virtual, directs the actualisation of the naming process.

The functioning of this work is similar in this sense to Feingold's *Head,* with both works enacting speech or image analysis in order to transact with the occasions initiated by a user. The words and sentences that are used by the computer exist as data in the archive of the database; the only thing that separates them from the user's reality is their activation by the user's particular selection of an object, the initiation of the database search and the software's retrieval of this data. These processes operate within the particular conditioning provided by the programming of the machine and the particular object that is selected.

Figure 61.

Figure 62.

David Rokeby, *The Giver of Names* (details), 1990 – ongoing

When we think of only pre-programmed computational processes, we only think of the realisation of a closed set of possibilities; the system goes through the processes for which it is programmed. However, when these computational processes are thought in concert with the processes of the experience outside the computer – the processes of

interaction – we begin to see a process that is more open – even if this process is limited to the user selecting an object and placing it on a pedestal. The interactive process here involves the user's selection directing, but not controlling in a predetermined fashion, the machine's processes. This is a distinction between the *possible* and the *potential* and may shed some light on the process of actualisation as opposed to the process of realisation.

Pierre Levy provides support for a distinction between the *possible* and the process of *realisation* and the *potential* and the process of *actualisation*. Levy points out that the actualisation from the virtual is separate from the realisation of the possible in that realisation suggests a passage from the possible to the static. In contrast, actualisation implies the production of something new and unforeseen, a becoming that results in new possibilities and transformations.[306] The possible exists in a state of 'limbo' as an already constituted thing, the only quality separating the real from the possible is existence. The possible is thus thought of as a latent phantom reality.[307] In contrast to this, the potential is to be thought of as unformed, as that which may or may not come into being through a process of actualisation. We can understand this after Deleuze as the potential not resembling the actual, just as the solution does not resemble the problem.[308] As Levy states "the virtual is that which has potential rather than actual existence…The tree is virtually present in the seed."[309] The seed does not know what shape the tree will take, as it would in a possible/real model. Rather the seed must actualise the tree as it enacts a process of negotiation between its internal potentialities and the environmental circumstances that it encounters through this process.[310] We can see similarities here with Simondon's example of the seed crystal whose growth is a product of its own energies and the liquid in which it is suspended. The user, similar to the seed or the crystal, does not know the shape or direction that their interaction within the digital encounter will take. It must rather be actualised by a process of negotiations between her own capacities, the interface's parameters, the software's programming and the environmental circumstances encountered in her interaction with the digital. Hence, in *The Giver of Names,* potential is actualised as the user selects an object, the system initiates processes of image analysis and recognition and then carries out database retrieval. The system works with the conditioning supplied by the user, evidenced as they supply the object to

be scanned, and the conditioning supplied by the machine, evidenced in its programming and the contents of its database. The output of interaction depends on the relationship between these two conditions.

So far in this chapter I have shown that the processes of interaction constitute an event in which the condition of 'userness' comes into relation with the condition of the particular digital system. This process initiates the actualisation of various information, relationships and affects. The process of interaction is above all a process *in* time; it is a process that is tied to the virtual as it actualises unforeseen processes that alter both the condition of 'userness' and the condition of the digital system. As such it is a process that takes into itself at each moment of presentness, future events, in the sense of potentiality, and past events, in the sense of a particular conditioning. The virtual/actual relationship allows us to view temporality as a process, as an event in which both actual occasions and their virtual counterparts are implicated in a temporality that sees the past and future co-existing in the present. We have seen so far in this chapter how the process of interaction operates within particular conditionings built up by the interactive process between a human and a digital system, in particular in terms of the programming of Rokeby's *The Giver of Names* and Feingold's *Head,* which provides the potential for the future becomings of the artworks. We have also seen, looking at Weibel and Gommel's *Flick_Ka* and Gabriel's *Breath,* that this process does not rely on an individual user, but rather on the condition of 'userness' as a set of actual occasions that come into contact with the digital system and are absorbed by the system.

Accepting the simultaneity of the virtual and the actual leads to a concept of thick duration in which the actualities of the present are pregnant with the virtual of the past and future. [311] As Deleuze states "…purely actual objects do not exist. Every actual surrounds itself with a cloud of virtual images."[312] Following Massumi, in order to understand the transitional qualities of an event, we must understand that exchanges occur between the actual and the virtual dimensions.[313] As Whitehead states, in reality, the actual and the non-actual achieve a unity in the experience of an actual entity; any actual event is the concrescence of many potentials.[314] Hence, the actual and the virtual

form a nexus and initiate an information flow; this is the initiation of process and the condition from which experiences take form.[315] Following this, Olkowski comments on this Deleuzian process, stating that the present exists as matter, whose materiality is destroyed and made virtual once it enters the past.[316] She points to one aspect of the virtual here that is accumulation of the past, as virtuality, in the present. Here in parallel to Whitehead's theory of actual entities, for Deleuze as duration flows, the set of entities changes as one instance of actuality perishes and is made virtual and another becomes actual from the potentiality of the future. As such we only become aware of the virtual through recollections.[317] As such, these recollections are not necessarily an act of 'looking back' in time, but instead should be understood as a tapping into the virtual.

Digital systems can be seen to play just this role of collecting sections of the past and future for use in the present. For instance, in the already mentioned *Head,* the computer uses a speech recognition system to interpret and log past interactive events. It then uses this information to direct the sentences that it enunciates in the future, in a sense learning based upon the conditioning of the past. The work here, using natural language processing routines that Feingold calls an Absurd Conversation Engine (ACE), is capable of producing rhyming responses and alliteration based on what it has heard.[318] Similarly, in *The Giver of Names* the words that have previously been entered by Rokeby into the database, the objects scanned by the user and the image analysis software provide the conditioning for the sentence that may be constructed. These processes set the degrees of freedom, in terms of a field of potential, from which the sentence actualises. We see this also in the already discussed *Slippery Traces,* in which past selections from the database are remembered by the machine and used in future interactive deliberations. In these examples the computational system constitutes certain conditionings, as established by the past's endurance in the present, that direct the process of actualisation.

As I have argued, in Deleuze's reading of Bergson reality is not set out as events on a timeline. [319] Rather the past is carried into the present, seen in Viola and Claerbout's works mentioned in the previous chapter. For Viola in *The Reflecting Pool* the past is frozen, exemplified by the static image of the diver, yet this section of past continues

through time, exemplified by the changing atmospheric conditions of the surroundings. For Claerbout, the static photograph of the past, exemplified in *Shadow Piece,* endures in the present, represented by the movement of pedestrians. In both these works time is not a linear structure. We have also seen this so far in this chapter, as the interactive present is formed by a conditioning from the past, either in the form of the machine's programming or its sensing and retention of the condition of 'userness'. In both the works of the previous chapter and the works discussed here, at every moment the present becomes thickened by its retention of the past in the present.

This thickening of duration can be seen to be central to the temporal aesthetics of database works. Works such as Agnes Hegedüs' *Things Spoken* (1998) (fig. 63-64), in which a user makes selections from a database of information, embody the concept of a past that continues to be felt in the present. In this work a diversity of objects that Hegedüs has collected throughout her life are digitised and able to be navigated and re-sorted. The objects are accompanied by a spoken narrative, which tells their story. This narrative, when activated, hyperlinks to other objects whose narrative shares specific common words. The objects can also be sorted in terms of size, weight, colour, function, or their origin, thus enabling multiple relationships to be generated across these slices of the past. As such, in *Things Spoken* the past is archived in terms of objects collected over time and charged with various narrative meanings. This past is then carried forward into the present able to be actualised at any moment. This is Deleuze's sheets of past made literal. Like the sheets of past, this work is an accumulation of the past, carried forward into the present. These can then be traversed in order to purposefully locate a recollection-image but may also spontaneously link to other images of the past.[320]

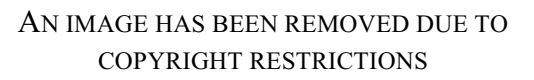

Figure 63. Figure 64.

Agnes Hegedüs, *Things Spoken* (details), 1998

In addition to the argument for the temporal aesthetics of digital interactivity as a past and future that are lodged in the present, I am laso putting forward in this chapter that the user be understood as more than an extended cognitive mechanism. Through temporalisation the user becomes connected *in* time to all the other actual entities involved in the event of interaction.[321] This is embodied in interactive works such as Monika Fleischmann and Wolfgang Strauss' VR application *Home of The Brain* (1990-1992) (fig. 65-66). In this work one user, wearing a data glove and data goggles, navigates through a digitally generated environment to discover four rooms that contain four different philosophers, who deliver information relating to the social effects of interactive media. The apparatus of the digital, in this case the data goggles and the data glove, draws the user into its time as it digitises her movements. For example, as the initiates certain hand gestures or movements of her head, the digital environment shifts perspective. As with most of the early examples of VR applications, this all occurs across a slight delay. The result of this is that the avatar's movements and navigation is not in exact synchronisation with the user's physical movement. Because of this there is a discrepancy between visual and vestibular information about the body's orientation and motion. In other words, the participant sees the consequences of her movements in the VR time and space, but these do not match up exactly with her sense of her movement in physical space. As a result, the movement that occurs as the outcome of this interaction is a particular type of movement, an unusual jarrying type of movement, out of temporal alignment with the digital, caused by the disjunction between the user's experience of lived time and the slightly delayed time presented in the VR world. The user must

interact within these processes of the digital, which here provides the limitations or conditioning to how the user's physical body operates.

Figure 65.

Figure 66.

Monika Fleischmann and Wolfgang Strauss, *Home of the Brain* (details of digitally generated environment), 1990-1992

We can similarly see the event of interaction as a process across different scales of the temporal in Paul Sermon's *Telematic Dreaming* (1992) (fig. 67-68). In this work two distinct locations are connected by the Integrated Service Digital Network (ISDN). In both locations, a double bed is situated. Users in each location physically lie on the bed within their space, which is captured by a camera. The moving images are then sent to the other location over the ISDN and projected onto another bed, next to another participant, physically present. As well as this monitors on either side of the bed display the composite image of both users on the one bed. In the interplay between a physical body and a digital projection human communicative signals such as conscious gestures and non-conscious flinching and other movements are conveyed, however, this again all occurs across a delay caused by the ISDN.

Grau has suggested that this response between users is intensely intimate between the two people, perhaps a thousand kilometres apart from one another.[322] The reason that he gives for this is that the senses of touch and vision are fused in the interaction with another's digital body. Of course it is not actually possible to touch the digital cipher, but the cipher nevertheless responds to the suggestion of touch, which we register through sight. Grau

describes this as a "…sensory impression achieved synaesthetically where hand and eye fuse."[323]

Figure 67.

Figure 68.

Paul Sermon, *Telematic Dreaming* (stills from installation), 1992

Thus, in the installation one person responds to the movements of their partner in almost real time, affected by the time lag due to the ISDN's bandwidth. Similar to *Home of the Brain,* the movements of the physical partner in lived time are conditioned by the delay of their movements as seen on the monitors, and as responded to by their digital partner. The transaction is a little less than natural here as the time of the physical is overlayed by the time of the digital and the delay makes clear the disjunctions in the physical-digital conversation.

In this work all the entities of the installation are connected and combine to produce the interactive occasion. The user is connected to the digital projection as the physicality of her body is transposed into a digital projection. They are articulated to the ISDN as their image is digitised and their meaningful gestures are only felt by their partner *through* this network and through its delay. They are thus connected to the interface and the software, its parameters, limitations and its temporality, as this facilitates every event of interaction.

The linking of the user to the time of the machine can be further seen, for example, in Del Favero's narrative based interactive installation *Pentimento* (2002) (fig. 69). In this work the user becomes hooked to a large database of narrative information as well as the affective and relational consequences of this information. In this work, the user enters a

dark octagonal installation space. Images are projected upon four walls that represent the events surrounding a murder in the Blue Mountains, presenting these events as fragments of narrative that are triggered by a motion detection system sensing the presence of a user in the room. These 'blocks' of narrative combine to construct a narrative that is multi-linear and told from constantly shifting perspectives. Interaction takes place in this work as the user moves through the installation space, sensed by the laser detection system, with her movements activating different levels of narrative. Having been given the responsibility for generating events from the machine, the experience of the work is largely constituted by the feeling of not being able to make sense of the events, but somehow still being able to experience their emotional intensity. The user becomes coupled to the narrative, she experiences it first hand, as she is responsible for generating the uncontrolled, disconnected, but highly affective images from the machine's database.

Figure 69.
Dennis Del Favero, *Pentimento,* 2002

Bennett has previously described this work as primarily about the way "…traumatic memory is lived in the present."[324] She states,

> Del Favero's works do not presume to translate the experience of others, or to render such experiences intelligible to us…We do not see the world 'through their (the character's) eyes' for we never know them well enough; rather we see, with them, a world that is made strange by alienating and traumatic experience.[325]

In this work Del Favero does not aim to create secondary trauma for the viewer but rather to "…open up the lived experience of trauma in its temporal and spatial dimensions."[326] The work is not a *representation* of trauma but is rather a *process* that sets the conditions for trauma to be felt. Here the work brings the user into contact with the digital medium,

as they are sensed by the motion tracking system, and also the piece's traumatic content, as they are actively involved in re-assembling the narrative 'blocks' and immersed in the installation space. Trauma is felt as the user, not only experiences, but causes the discontinuous and turbulent temporal dimensions of the narrative through her movement in the present. The present event of interaction is thus an event that contains the multiple sections of past that are generated by the machine. This is a turbulent type of time that, as is the case with Hegedüs' *Things Spoken,* involves processes in the present that actuate the database's information from the past.

4.5 The Extension of Occasions: Interaction and Prehension

As I have pointed out in this chapter, for Whitehead, the idea of experience as a subject cognitively apprehending an object is innately flawed. [327] So far I have attempted to address this problem by deploying the concept of the condition of 'userness'. This has allowed me to focus upon interaction and the relationship formed between the condition of 'userness' and the condition of the digital, rather than focusing on a particular user. By this I have viewed interaction as a transaction produced as the extension of a collection of occasions. I have attempted to avoid the knower/known model of experience and thus attempted to avoid the privileged position that it gives to an individual subject, instead focusing upon the processes and conditioning that precedes human experience.

As Colebrook points out, for Deleuze "there is not a brain that perceives or a subject that is affected"[328], rather life exists as events of becoming that affect one another. It is not that we perceive a world of images, but rather that we are an image amongst images. For Deleuze there is not a knower/known relationship, because our consciousness, our brains and our bodies are simply other images that go toward making up the world of images. Experience is thus emergent in the commingling and relationship of images.[329] This commingling can be witnessed in the event of the digital encounter as the commingling of the condition of 'userness' and the condition of the digital system. Interaction occurs as a set of user-generated processes operate within the limitations and the operations of the particular information technologies.[330] Whitehead provides a model that allows

interaction to be understood in this vein, as an ongoing transaction between many feeling entities, a model that does not necessarily centre on the conscious subject.

Mackenzie stresses that any contemplation of the way in which we operate with the digital must not only consider the material events and the images of the interface but must also consider the machine's particular software processes.[331] Here, we are not so much interested in the reception of images by a conscious user per se, but rather the process of the digital encounter in which many user, hardware and software occasions are implicated.[332]

For example, in Del Favero's already mentioned *Pentimento* the interactive aesthetics of the work are brought about not by an observation of given facts but rather by an observation *with* changing processes.[333] In the work trauma is performed as the user is responsible for generating blocks of narrative via her movement around the space. This interactive event conditions the way in which the 'user' experiences the images upon the screen and her future movements in the space. Also, in Gabriel's *Breath,* mentioned at the beginning of this chapter, the 'user's' actions, the movement of her diaphragm, are inextricable from the digital aesthetics. As the 'user's' breathing controls the movement of the digitally generated image, she also regulates her breathing in relation to the digitally generated image. The 'user' in this sense both controls the images, but the images also control the 'user', as the 'user' recognises that her breathing controls the images, she becomes more aware of her breathing and regulates this, prompted by the oscillation of the digital images. The actions of the 'user' here are not merely directed by the machine, nor are the actions of the machine solely directed by the 'user'. Rather, in both works the event of interaction is a consequence of a 'common operation' of the 'user' *and* the machine. Here the experience of the work is not merely constituted by the image upon the interface, rather interactive aesthetics are a product of the physical and digital processes that actualise this image.

The ecology of entities that I see occurring at the level of interaction has previously been described by Fuller on the level of media systems and technologies. Fuller investigates

the complex interactions of media systems, understanding these systems as processes or compositions, rather than discrete technologies. We can use Fuller's exploration of these ecologies to frame the way interaction involves a collection or network of contemporary occasions that work together as an ensemble. Fuller states, "a media ecology is a cascade of parasites. These parasites rolling around inside each other's stomachs…these medial organs all grab hold of each other, gain purchase and insight by means of their particular capacities."[334] A media ecology is this multiplicity of processes, all extending over one another and all shaped by those things to which they connect. Every entity in the media ecology prehends and experiences every other entity and this shapes the way the particular entity behaves. For instance, Fuller describes the media ecology brought into existence by various examples of pirate radio broadcasts operating in London from the 1980s through to the present.[335] This ecology is made up of many elements occupying different registers such as transmission and reception technics, record shops, turntables, microphones, mobile phones, aspects of the legal system relating to broadcasting, advertising, drugs, clubs, flyers, and so on. All these elements produce a multiplicity of processes that constitute the media complex that is pirate radio.[336]

To further this Fuller describes an ecology as more than an aggregate, it is a structuring that has a movement or tendency that is singular to it. Regarding pirate radio, he gives the example of the voice of the DJ which 'conducts' or organizes the elements and through which the elements move. This example is worth unpacking here as it provides an elaboration on my notion of the condition of 'userness' and a departure from a theory of technology and media that is centered on a 'user' or a subject. Firstly Fuller describes the things that the microphone of pirate radio is connected to as "voices, throats, lungs, codes, language."[337] These things operate within the context of the music and the loudspeaker, directing the ecology of pirate radio. Fuller goes on to further point out that the voice is the product of a particular milieu. For instance, the voice invented by soul, R&B and hip hop, is both produced by a propulsion forward, through the throat and out of the mouth, and also produced by a reflection back to its larger context; Fuller states "they (voices) also point precisely back to where they come from."[338] The voice, as Fuller states, "emerges not only from a particular body, but from a body that has emerged from

the violence of racist and class stratification of the United States, the *banlieue,* the townships and the fractal colonialism of the U.K."[339]

The voice can thus be understood transductively, as an entity whose becoming is directed by a common operation between the ecology in which it finds itself – such as the throat, lungs, mouth, the conditioning of language, the cultural milieu, the technical milieu – and the internal forces of the voice. Here Fuller positions the voice as energy, texture and force, rather than as the 'voice' of the subject. We again see that what is important in understanding ecologies, including ecologies formed between a human and technology, is not to understand the individual entities or the aggregate of these entities, but to instead understand the processes that set the conditioning of these ecologies, and which give the substantiality or character to the individual entities.

Mackenzie also discusses these types of ecologies, terming them ensembles. Mackenzie shows how the technicity of an ensemble is always *in situ*, it is always localised and encumbered. For instance, he points out that the mobile phone or wireless technology is in fact massively constrained and weighed down by its reliance on an ensemble of networks and communications infrastructure.[340] The point is that technical mediation is always connected, and sometimes weighed down, by its context; it is contingent upon the other agents that constitute its ensemble. Mackenzie illustrates this further by giving the example of an engine, which cannot be isolated from its associated milieu. The milieu, including airflow, lubricants and fuel, conditions and is conditioned by the functioning of the engine.

This can be seen in Del Favero's already mentioned *Pentimento.* As previously seen, the contemporary actual occasions of interaction, being the occasion of the user and the occasion of the machine, prehend one another over time. As the user is sensed by the motion detection system they are prehended by the digital system, as the user senses the images and audio, they prehend the digital artwork. This prehension though does not itself *cause* the user or the artwork to behave in a certain way, just as the lubricant or airflow does not *cause* the engine to function. Rather the prehension of the contemporary

occasions of interaction, just as the lubricants or airflow, provide a *conditioning* from which the artwork and the user become. In other words, the prehension provides information that may *direct* the entity to behave in a certain way. The way that a particular user moves around the installation space may trigger the images from the work's database, however, the images and their triggering are pre-determined by the artist. In the same sense, the artwork cannot cause the user to move in a particular way. The user moves based upon her own energies and forces, but, when interacting with the work, these energies and forces are conditioned by the machine, they are directed toward actuating a certain narrative from the machine.

This type of experience in which the conditioning of the digital system and the process of interaction directs the experience of the work can also be seen in interaction with Luc Courchesne's *Portrait No. 1*(1990) (fig. 70)*,* a model of interaction that is close to day-to-day computer use – sitting at a desk, interacting with a screen-based interface. However in this event we see a more complex set of relationships at play than in Human Centered Interaction (HCI). This work allows the user to converse, via a closed menu, with a representation of a woman upon a screen, Maria. This conversation becomes at times personal as Maria becomes occasionally flirtatious and occasionally confrontational. Maria's mood changes and she either extends or ends the conversation based upon the user's selections from the closed set menu. Maria, as an anthropomorphism of the machine, works with the selections made by the user, her responses are preformed in the machine's database, to be triggered by the user's selection. There is a feeling though that Maria, not the 'user', is in control here.

Figure 70.
Luc Courchesne's *Portrait No. 1,* 1990

In this work the entities that constitute the computational system such as the entities that make up the interface, the screen, the software that triggers various responses and the visualisation technology that produces Maria for us, extend over us, as the user. For instance, a conversation with Maria begins as we select "excuse me" and then "may I ask you something", to which she responds "you can try…it depends really." From here we may choose from "What do you do?", "Who are you?" or "Do I stand a chance?" Choosing any one of these triggers a pre-determined response and further selections. For instance, "Do I stand a chance?" leads to her laughing and then replying "yes maybe, I don't know, I usually like people who are direct." From here the user follows the pre-determined pathways through the work, which inevitably lead to Maria ending the conversation after we choose something that does not interest her, and to which she responds "never mind…it doesn't matter really."

The entities of the interface and the processes of the software direct us towards a certain experience through forcing us to adapt to their restrictions. They extend over us in the sense that they condition the way that we operate and limit our responses in the particular moment of interaction. We must respond to Maria via the closed menu, although we would perhaps rather respond in a more meaningful way. Here it is the selections available to us, the things that the machine will let us achieve, that direct interaction. The

limited model of interaction provided by the closed set menu is perhaps why we, as the user, do not feel in control here: rather it is Maria and the machine that control the level of interactivity. The interactive event thus occurs as the conversation is constructed via user-initiated processes that work within the limiting conditions of the machine.

But the entities that constitute us as 'user' also limit the conditions of experience. We, as 'user', direct the experience of interaction based on our habits, our history as a society of actual entities and our capacity to use the interface. As we embody interaction, experience can be thought of as a relational process. It is not that the 'user' merely apprehends a passive machine. Rather the machine is active. This is obvious in the previous examples, such as Feingold's *Head* and Del Favero's *Pentimento.* Through its interrelationship with the user, any moment of the interactive experience is constituted by the active participation of both the 'user' and the machine.

This is a process of transduction, touched on at the beginning of this chapter. Transduction is a process in which actualisation is directed by the environment in which the process operates, but also a process in which actualisation directs the becoming of the environment in which it operates.[341] As such, this concept can be used along with Deleuze's previously set out concept of the virtual, to better understand the conditioning that is presupposed in the interactive experience and the way that technology may impact upon processes of becoming. A process of becoming is, as Simondon states, "not to be thought of as the meeting of a previous form and matter existing as already constituted and separate terms, but a resolution taking place in the heart of a metastable system rich in potentials."[342] Here it is not that a particular environment acts as a mould for process, or that an individual's actions alone are constitutive of becoming. Instead the two operate together, setting conditions upon what may be termed the process of 'individuation', 'structuration' or 'differentiation': perhaps best thought of as the process of becoming. Bringing this to bear on digital interaction, we can think of a user as an entity that goes through a process of becoming, directed not solely by her own conditioning nor solely by the machine's direction or restriction, but rather by the commingling of both conditions. This is the same transaction seen in Simondon's example of the growth of the seed crystal

and its liquid environment, described at the beginning of this chapter, in which a negotiation between internal energies and potentials and external conditionings directs the process of becoming.

Building upon this, Mackenzie states "the stabilisation over time of bodily boundaries and surfaces need not be seen as either imposed from the outside (as a form), or as essential to bodies, but as the consequence of a 'common operation' occuring between the living and the non-living."[343] Reading this through Whitehead, transduction is a process in which contemporary actual entities prehend one another and direct one another's becoming; transduction is a process in which an actual entity becomes due to a composition of forces. This can be thought of in terms of digital interaction as a 'common operation' of technology and the human body, a transaction in which the human body is understood transductively as technology both restricts it and enables it to operate in specific ways. By the same token, the body restricts and enables the becoming of the technological space, as its operations trigger particular technological operations.

The process of transduction involves more than just strapping on sensors or manipulating interfaces, although it involves this too; the process involves the deconstructive logic of the supplement.[344] Here, the supplement that is thought to be merely added on to the primary entity, actually reveals this action to be irreversible as it forms a milieu, ecology or ensemble. Mackenzie points out that the supplement, in this case the digital, turns out to be inextricably presupposed in the condition of that to which it is added.

This has been seen in *Home of the Brain* and *Telematic Dreaming*, mentioned earlier, in which movement in lived time is slightly delayed in digital time. In these two works movement is neither directed solely by the user nor by the machine, but rather by a common conditioning provided by interacting across a slightly delayed temporality. The situation that causes the movement of the participant is not a condition of the subject alone, nor something that is directed by the environment alone. Rather it is a condition that arises from the common operation of the two. Movement is directed by the

participant, as she attempts to explore the environment but also directed by the machine, as the time lag causes her to move in a certain manner.

The condition of 'userness' is thus a condition in which material actions and processes can be understood transductively in relation to the specific information technologies with which they interact. This transduction amounts to a temporal transaction whereby the machinic system and the human system work *through* one another. They work within the degrees of freedom of the other. This transaction sets the limits on the processes that are carried out in the digital encounter. The user has to operate within the limitations of the machine, including the restrictions of the interactive hardware and the operation of the machine's software. Likewise, the machine has to operate within the limitations of the user; the user's capacity to 'use' the machine limits those processes and outputs of which the machine is capable. In short, the individual character of the condition of 'userness' and the condition of the machine are the outcomes of the prehension and concrescence of the two systems at every occasion in the passage of interaction.

CHAPTER 5

Time, Events and Space: Space Re-Thought

Time per se is an absurdity; likewise space per se. The relative and the absolute are reflections of one another: each refers back to the other, and the same is true of space and time.

Henri Lefebvre, *The Production of Space,* p. 181

In the previous chapter I have discussed the digital encounter with interactive media art in terms of the commingling of the condition of 'userness' and the conditioning of the machine. I explored this mesh as a processual activity that actualises potential from a field of the virtual. I have also implicated the interrelationship of digital and physical time as generative of novel experiences of time. In this chapter I further this concept in order to investigate the connections between digital and physical processes and the type of interaction spaces in which these processes play out. The interactive event, as a collection of actual occasions, is thus positioned as involved in a process of becoming that is fundamentally linked to the space in which this becoming plays out. In this chapter, following on from the previous, I want to understand the interactive process transductively, as a process that is directed by the common operation of forces and conditionings. I will examine this common operation and elaborate it with examples in which the interactive event, whilst producing a particular type of time through its process, also produces a particular type of space; importantly this is a temporal type of space, a type of space that is *performed.*

This chapter will examine the ways we can think of the space of interaction, or the space of the digital, as the outcome of a process of events. By arguing this I hope to move beyond the space metaphors discussed in Chapter 1. Rather than positioning the space of the digital as an embedding 'other' space, I hope to position it as a space that is continually produced by the process of events. Hence in terms of the aesthetics of digital interaction, space – whether this be the space of the Internet, the space of the database, or

the digital and physical spaces of the interactive installation – is linked to temporal process. Space emerges from the conditioning produced by process, and this conditioning is the condition of permanence and flux that Whitehead speaks of in *The Concept of Nature* and *Process and Reality*. Space achieves the *appearance* of permanence because of the flux of events. Just as the river is constituted by ever-flowing water and the sun is constituted by the continual process of its fire, the aesthetic spaces that are associated with the digital are constituted by the events that arise from interaction.

We can understand this production of, and encounter with, space through a Whiteheadian framework by investigating the concept of the extensive continuum, a concept that I introduced in Chapter 2. Whitehead states that the extensive continuum is the wider complex of becoming from which actual occasions emerge. He points out that "this extensive continuum is one relational complex in which all potential objectifications find their niche. It underlies the whole world, past, present, and future."[345] As Halewood points out, this may seem to suggest a pre-existent ground that subtends all existence; in essence a space from which objects emerge. But as Halewood goes on to indicate, this is certainly not Whitehead's position.[346] This is because the extensive continuum comprises of actual entities; the extensive continuum is made up of actual entities that have already become and now accumulate in the extensive continuum, providing the potential for ingression in the present entity's becoming.[347] The extensive continuum, like Deleuze's virtual, is thus relative to the process of events; it is constituted by occasions as well as providing the field of potential for future occasions. We can think about the space of the digital in the same way that Whitehead thinks about the extensive continuum. Whether it be the organisational space of the database, the space of the Internet or the mixed reality spaces of immersive installations, space is not a pre-existent structure from which objects emerge and in which interaction is carried out. Rather these types of digital spaces are a type of space that is at once produced by events and at the same time provides a field of potential for future events. We can thus think of these digital spaces as an extensive continuum; a space that collects events of the past and through this provides potential for the future. These types of spaces will be explored throughout this chapter.

5.1 Hybrid Spaces

Extrapolating from Whitehead, the space of digital interaction can be thought of as produced by a processual flux of events between the processes initiated by a user and the processes of a digital system. As Massumi points out, space may be thought of as differential when there is a co-adaptation of interaction between forces.[348] For instance, in Del Favero's *Pentimento* mentioned in the previous chapter, a traumatic space is produced by a co-adaptation of human forces and machinic forces. The movement of a human user, sensed by a motion detection system, causes the triggering of blocks of narrative from the machine's database. These blocks of narrative combine to tell a multi-linear narrative of a murder involving a father, son and daughter. The story is told from multiple and constantly shifting perspectives; in one the father murders his daughter, in another the son murders his father and in another the daughter murders her father. If the participant restricts her movements to stationary points in the room she activates one layer of the narrative, told from one perspective. In this instance of interaction we see a narrative of the murder either from the point of view of a guilty daughter or a guilty son, with the events of the narrative constantly shifting in time. On the other hand, if the participant constantly moves through the room the narrative becomes multi-linear as we see in some blocks that the father is murdered, and in others that the father murders. The traumatic space is thus produced by a co-adaptation as the narrative adapts itself and is regulated by the user's movements around the space, while at the same time the user adapts her movement in the installation space to attempt to trigger specific blocks of narrative. The interaction between human and machine that marks the digital encounter, as seen here, produces a particular type of space; a type of hybrid space, a space known as a mixed reality space, in which there is no strict division between the digital and the physical. This is a space that is at once constituted by the narrative content of the artwork and also by the interactive processes initiated by the human user. In other words, the aesthetics of the space of the immersive work are constituted by the relationship between the cinematic content and the actions that are performed in order to actuate this content.

As established in Chapter 2, Whitehead holds that the given material world exists as a nexus of actual entities and that this given material world is constituted by events that

occur through time.[349] This is just how the narrative of *Pentimento* is constructed, as a nexus formed between blocks of narrative and the interactive activities of a user. The aesthetics of the work are manifest by physical events and digital events, which combine to give the character to the space in which they play out. As Whitehead states there is no continuous stuff; as the user moves she triggers a narrative, which is continually in the process of creation. Space and the aesthetics of the narrative are produced as space, and every object within it, is remade at every instant of duration.[350] In this sense, the space of the digital cannot be pictured as an empty 'other' space that is to be filled by digital information. Rather, the argument is that the interrelationship of digital information – or digital occasions – and physical information – or physical occasions – actually produces the space of interaction and the aesthetics of the artwork.

This Whiteheadian reading of space sees events, one of which is the user, emerging from the world and its process.[351] So, for Whitehead, the remaking of the environment and the entities within the environment, including the becoming user of one of these entities, is something that occurs as the user and the environment prehend and respond to one another, in a sense performing the space through an interactive relationship. Whitehead states, "…the character of an organism depends on that of its environment. But the character of an environment is the sum of the characters of the various societies of actual entities which jointly constitute that environment."[352] Here Whitehead indicates that the actual entity, in our case a society of entities that constitute the human as user, is characterised by its environment. In the structure of a feedback loop, this same multiplicity of entities interrelates with many other actual entities to constitute this environment. As argued in the previous chapter, both the condition of the environment and the condition of 'userness' impact upon one another and thus adapt to one another, changing their condition at every instant. They form a concrescence in which the condition of one affects the condition of the other. This is how space is produced, as the effect of the relationship formed between the occasions of the world. In the case of the mixed reality spaces of digital artworks, the aesthetic spaces of the digital encounter are the outcome of a process of interaction.

We can see this occurring quite simply in a work such as Wolfgang Müench and Kiyoshi Furukawa's *Bubbles* (2000) (fig. 71). In this work a participant can interact with digitally generated bubbles via her shadow cast on a projection screen. By stepping in front of the projector's light beam a participant can cause the bubbles that slowly float down the projection space to bounce off her silhouette, behaving as if her shadow were a solid object. In this work the body, sensed machinically, becomes central to the interactive event. More precisely, the outline of the body becomes central as an interface to the two-dimensional space of the projection screen. In terms of the programming of the system, *Bubbles* is composed of simple autonomous objects. Each bubble is paired with a script object that defines its behaviour in the projection space, encoding into computer readable information physical laws such as gravity. In order to recognise the position of the shadow and use this to cause the program to perform a routine that causes the bubbles to 'bounce', the digitally generated image is continuously compared with the camera input. When the two images differ the system recognises a shadow.

AN IMAGE HAS BEEN REMOVED DUE TO COPYRIGHT RESTRICTIONS

Figure 71.
Wolfgang Müench and Kiyoshi Furukawa's, *Bubbles,* 2000

In terms of the differentiation of two systems, the movement of the user is differentiated as she moves in certain ways to make her shadow come into contact with a bubble. As the system compares the generated image with the camera input and recognises difference, the program causes the bubbles to bounce off objects below a certain level of brightness. This is a differentiation of the system's operation brought about as it senses the user,

encodes her physical movements and allows these to interact with programmed behaviours. The aesthetics of interaction are here an outcome of the two systems sensing/reading one another and initiating processes based on this information.

This is Whitehead's central argument in his philosophy of an organism; the world is an ecology of occasions, all responding to one another. Following Whitehead we must view interaction with digital systems as essentially hybrid, and furthermore as a process of hybridisation.[353] As already discussed, this division of the world into subjects and objects that Whitehead attempts to remedy is a result of the type of logic that positions reality as made up of physical objects, which are separate from the thoughts, concepts and feelings of human subjects. Whitehead rejects this notion and rather positions the world as made up of a process in which objects or 'things' and the experience of these 'things' are inextricably linked; this is the hybridisation of the world. It in essence is a hybridisation of actualities. This involves physical objects and potentialities, or the experiences and affects of these physical objects.[354] The experience of the user, whether conscious or non-conscious, is linked to the experience of the environment. This *experience* is just as real as the physical object of the human body or the elements of the digital system. There is thus a user-event that constitutes the state of the user and a machine-event that constitutes the state of the machine. Both the user-event and the machine-event are involved in a process of actualising potential based upon their response to one another. Here, following both Whitehead and Deleuze, the objects or 'things' that exist are not as important to our analysis as the events and interrelationships that are the condition by which these 'things' exist.

For instance, to return to Sermon's *Telematic Dreaming,* discussed in the previous chapter, the work is experienced as a process of hybridisation. The occasion of one user comes into contact with the different occasion of another user. These occasions further come into contact with the ISDN line, including the slight time lag and disjunctive movement associated with transmitting the moving image over this line, as already discussed in the previous chapter. What is important to our understanding of interactive

aesthetics here is not the object or image of the user, but rather the processes that actuate this image and the relationships that these processes bring about.

Interaction with *Telematic Dreaming* is a process that brings together the multiple different occasions of the physical and digital. The physical is made hybrid as it is mediated by the digital and by the same token the digital is made hybrid as the affect of the processes of mediation, specifically the ISDN's slight delay, are felt in the physical world, resulting in the user's movements in response to her digital partner. These events that can be thought of as a result of the exchange of information from the digital to the physical and from the physical to the digital, as with *Pentimento,* constitute a mixed reality space that is brought about by the common operation of the digital and the physical in one space.

Deleuze echoes Whitehead's sentiments relating to the way that space can be thought of as a particular milieu that is relative to those things or occasions that constitute the milieu. As Colebrook states when commenting on Deleuze's philosophy, "space would, then, be the effect of a synthesis of points, not a container or ground. Space is the effect of relations. This would apply both to space in a metaphorical sense, such as the space or field of a grammar or social structure, and literal space."[355] This means that space is a process of Whitehead's afore mentioned hybridisation, a constant becoming based on the information exchanged by contemporary occasions, rather than an empty, 'already there' container. This becoming is thus driven by the nexus of actual occasions, which sees the past directing the present, as has been described in the previous chapters, and also by the context or the environment in which this becoming plays out. This environment, whilst being altered by the process of becoming, also provides the conditioning for this becoming.

The event of hybridisation, and the production of a hybrid space and time can again be seen simply in Münch and Furukawa's *Bubbles*. The playful interaction that takes place here occurs in a hybrid space and time. The physical actions of a body are projected on the projection screen in the form of a shadow cast via the projection beam. These actions

performed in physical space and time are then captured by a camera, subjected to image comparison and converted into digital information that effects the two dimensional space of the digitally generated bubbles. The space is thus hybrid here as the participant's body moves in physical time and space whilst its effects are felt in the digitally generated space of the projection. In *Bubbles* the hybrid space is thus produced by the occasion of a moving body of a user, the camera that captures this image and the screen that provides the space for the digitally generated bubbles. The hybrid space is further produced by the process of mediation, the process in which the user's body is translated into the digital by the image analysis software and sensed by the algorithm for recognising the difference in brightness between the generated image and the image captured by the camera. The bubbles themselves are also occasions that exist on two levels. They exist in the sense that they are able to be seen by the user upon the projection screen, but they also exist at the level of software as script objects that define their appearance and the set of rules that define the parameters of their behaviour. Both the bubbles and the user's shadow exist in actuality, as they can both be seen, and also exist in terms of a conditioning or programming on the level of digital information. In this work there are thus multiple processes occurring at the level of software, hardware and the physical movements of the user. These processes work together in a common operation to produce the hybrid space of interaction.

Following this, my argument is that there is no one embedding space in which the 'subject' and the artwork converge. In contrast, the events of the digital encounter converge in order to constitute space. The space of the digital encounter is not a pre-existing field that sets the conditions for aesthetic events to emerge. Rather, space *emerges*. Space is that which is made actual by the interrelationships formed in the interaction event.

We can further understand this concept in aesthetic terms through Jeffrey Shaw, Agnes Hegedüs and Berndt Lintermann's *ConFIGURING the Cave* (1996) (fig. 72-73), in which we again see the hybrid event of interaction across the physical and the digital. Here digital and material events can be seen to converge in order to constitute space.

ConFIGURING the Cave utilises CAVE technology, a stereographic virtual reality environment.[356] CAVE is a recursive acronym for the Cave Automatic Virtual Environment. This virtual reality environment differs from the previously described head mounted displays and data gloves utilised in *Osmose* or *Home of the Brain* as the CAVE is based on the projection of digitally generated images into a physical space. In this environment the images are made visible by three rear projection walls and the down projection floor of the environment. In addition, in order for the images to appear in three dimensions, the CAVE involves the participant wearing stereoscopic liquid crystal shutter glasses. The glasses work in concert with the projection system, which alternatively projects two images, one for the right eye and one for the left eye. An infrared sensor attached to the glasses indicates which image is projected at which instant in time, and the glasses darken either the right or left lens in sympathy, causing the brain to register an image in 3D. These differences between the CAVE and the display system of a full head-mounted VR system importantly allow the user to see their own body in the environment. The space is mixed as the physical and the digital share the same space, rather than the user being transcoded into the digital environment of VR as an avatar. I include this work in the discussion of hybrid spaces and mixed reality as it is, similarly to *Bubbles, Pentimento* and *Telematic Dreaming,* a space in which physical processes and digital processes work through one another to produce a particular aesthetic space.

In *ConFIGURING the Cave* the participant interacts with the digital images and sounds by manipulating the poses of a life-size artist's mannequin that stands in the centre of the CAVE. Actions made in the physical space affect the digitally generated images and sounds. In this work Shaw has programmed seven pictorial domains, by moving the mannequin into different poses the user may navigate a domain, causing the images to circulate around the room in varying speeds. The most weighted movement of the mannequin is to position its hands covering its eyes, which causes the transition from one pictorial domain to another. As Whitehead would have it, the series of actual occasions, seen here in the occasion of moving the mannequin, that constitutes an event in the physical realm, actualise the digitally augmented environment. The environment then

causes responses from the participant, which generate other images and advance the production of the mixed reality environment.

Figure 72.

Figure 73.

Jeffrey Shaw, Agnes Hegedüs and Berndt Lintermann, Installation View of *ConFIGURING the Cave,* 1996

In Shaw, Hegedüs and Lintermann's work the digital and the material come together to produce a mixed reality immersive space. The way in which we understand and operate within this type of space is not constituted by any notion of an empty embedding structure waiting to be filled by events. Rather our understanding and operation of space within the CAVE is produced by the interactive events that occur as the material and the digital converge. As the mannequin is physically manipulated, it is sensed by the digital system, which enacts a process of image and sound generation. The outcome of this digital process is then made available to the user via the stereoscopic glasses in the physical space of the CAVE. This information, the way in which the images are moving around the space, then causes the participant to move the mannequin in order to either actuate further images and sounds by moving to a different pictorial domain or navigating the current domain. The space is *performed* as just-past actions affect the space of the present. The just-past actions of the movement of the mannequin, the computational processes that follow, the transmission of images and sounds across the CAVE and the operation of the glasses that constitutes the present state of the mixed reality space.

This interactive event of *ConFIGURING the Cave* is an occasion in which digital and physical processes commingle to prompt a certain mixed reality space to become. The

movement of the mannequin sensed and converted into digital information affects the form that the mixed reality space will take. This is a process of digital images sensed by stereoscopic glasses, which re-present the visual information through their rapid opening and closing of the left and right shutters to the user, who then moves the mannequin based upon the images that they sense and her interest in seeing more images, which causes the further generation of digital images. These events dovetail into one another such that there is a continuity of flow and a continuous becoming of space.

5.2 Digital Spaces and Physical Occasions

As well as in mixed reality environments, we can also see that events produce conceptions of space in digitally generated spaces. For instance, Mark Amerika's online artwork *FILMTEXT 2.0* (2002) (fig. 74) produces a digital space through the remixing of temporal occasions. This work has been reproduced several times using the same source material, online as a Flash version, an MP3 concept album, a looping DVD version exhibited in museums and galleries, and a series of live performances. Here I will focus on the online Flash version of the work. *FILMTEXT 2.0* is a collection of landscape imagery, rapidly moving images, text and audio, which is navigated through by clicking on links, revealing layers of the narrative, but without the user being exactly sure what the consequence of this clicking will be, as if, to use a spatial metaphor, 'surfing' the Internet. The narrative of this work centres on a character that Amerika calls the 'Digital Thoughtographer', a futuristic traveller that traverses these various spaces, communicating with the user through scrolling text. We take part in this work as 'metatourists', led through the levels by the 'Digital Thoughtographer.' In this work we are taken into apocalyptic landscapes, in which computer viruses and biological viruses share the same level of consequence, with no signs of life, apart from the occasional flashes of the Thoughtographer, only seen in shadow, and blurred, rapidly moving images. As the narrative progresses the user moves from level to level, activating various communicative signals from the Thoughtographer, which come to us in a somewhat garbled and other-worldly fashion, in that we cannot entirely grasp the literal meaning and purpose of the communications, perhaps because we exist in a different time to the Thoughtographer.

Instead, we seem to just drift through the various levels, never really sure of our purpose in this digital space.

Figure 74.
Mark Amerika, *FILMTEXT 2.0* (screenshot), 2002

Amerika takes the source material of *FILMTEXT 2.0* from various geographical locations, such as the landscapes of Australia, Tokyo, Hawaii and Southeast Asia.[357] Amerika travels around physical space, recording several desert landscapes, as well as footage taken at night in Tokyo and Hong Kong.[358] This source material, recorded in a particular time and place, is subjected to digital re-mixing in order to produce the digital space; a type of desert landscape that is augmented by the blurred images of figures and bright lights, the communications of the Thoughtographer, as well as the digitally generated images that overlay the landscape. As such the act of re-mixing, or re-presenting past physical occasions, bringing the past into contact with the digital present, creates the digital space in the present. As Amerika states:

> Choosing a location for some of the visual source material is crucial. Picking up natural sounds in the areas where the shooting happens is also crucial. Again, not for the sake of capturing the so-called "truth of the moment" but as just more source-material. So that it's quite possible that some of the idle chatter picked up during a Tokyo night-shoot will be utterly manipulated so that it becomes part of the electronica soundtrack in one of the desert video loops which then gets expanded into a ten-minute full-on title track to the MP3 album which, because of its use of narrative vocals, becomes yet another digital narrative in the formatting mix.[359]

Here Amerika emphasises the way that the source material can be re-sourced, re-mixed or re-presented, into a new milieu. In this sense, he uses the Internet as a compositional tool with which to evolve the digital from the everyday. These once physical occasions now transcoded into digital occasions are put together to construct the digital space of the work; the occasions now produce the space in which they play out. As seen here, digital space is produced as physical occasions are transplanted into the digital and subject to digital processes of re-mixing. Each occasion has been mediated by the digital processes that Amerika enacts in composing the work and that the various users initiate in accessing the work. These processes involve the initial recording of the source material on Amerika's analogue 35mm camera, the process of then digitising this film and composing the various landscapes through which the user navigates. In *FILMTEXT 2.0* we thus see a collection of mediated occasions, abstracted from their original context, and put into relation in order to constitute a particular digital space. Importantly, this process of mediation, that in this case involves the translation of analogue into digital, has changed the information. Not simply due to the conversion of the analogue image to a digital image, but also on the level of the occasion's substantiality. The mediated occasions are now put into a context with other source material. It is now within this context that the substantiality of the once physical now digital occasions takes form. The digital space here may be understood as a collage of occasions that work together in order to produce their new context. Here, as with the engine's milieu that Mackenzie gave us in the previous chapter, any one occasion cannot be isolated from its associated context. The text-events, audio-events and image-events all take information from one another in the sense that these elements are conceptually connected. The user cannot experience the narrative which is unfolding in the sections of text without also experiencing the audio and visual images of the space.

We can see another example of an ecology that produces the space in which it plays out in interactive and immersive works such as Christa Sommerer and Laurent Mignonneau's *Intro Act* (1995) (fig. 75-76). Instead of space being produced by the act of re-mixing content and the creation of a new context for this content, space is produced here in a

similar way to *Bubbles,* as an ecology is formed between the occasions of a user and the occasions of a machine, in particular, the physical movements of the user and the generation of images by the machine. In this work, the participant's body, when entering the installation space, is sensed by a camera and projected onto a digitally generated space, with her movements detected along the *x, y* and *z* axis by a camera detection system.[360] As the participant moves in the physical space they generate organic shapes within the digital space.[361] The manner in which these abstract organic shapes evolve and disintegrate is directly linked to the movements that the participant makes within the physical space of the installation, here the user initiated gestures become the interface between human and computer. For instance, if the participant extends her arm a certain way, she will cause the growth of digitally generated forms out of her hand, as digital form matches up to physical gesture.[362]

Figure 75.

Figure 76.

Christa Sommerer and Laurent Mignonneau, Detail of Digital Environment from *Intro Act,* 1995

This is a further example of Mackenzie's transduction, described in the previous chapter as a process of differentiation that occurs at the intersection of internal drives and external forces. As Mackenzie states, "transductive processes occur at the interface between technical and non-technical, human and non-human, living and non-living."[363] This occurs here as the digital system grows an image based upon its own internal programming and its relationship with the movements of a human body. The digital image thus grows at the interface between human and machine and is directed by the relationship formed between these two systems. For instance, the user might move her

hand in a particular manner in order to direct the digitally generated images to 'grow' along certain parameters. In this process, the system senses a particular movement via a hardware system called 3D video key, developed by Mignonneau. This system uses a camera tracking system in combination with a background extraction method to allow the three dimensional real time integration of the image and the movements of a participant into a digital space. After sensing information via this hardware system, the machine then generates a digital image on the screen based on the gestures of the participant. The way in which the digital image 'grows' is transductively produced at the interface between the movements of the participant and the responses that this is programmed to trigger from the digital system. As Sommerer and Mignonneau state "while interacting the visitor becomes engulfed in the virtual world…defining it, creating it, exploring it and destroying it."[364] The participant works as an external force to the machine's internal programming, prompting it to behave in a certain manner and generate specific types of images upon the screen.

In this work, as well as *Bubbles,* and *ConFIGURING the Cave,* actions performed in physical space and time are sensed and converted into digital information. In terms of *Bubbles* and *Intro Act* the actual body of the participant is sensed by the machine and re-presented within a digital space and time and used to direct the behaviour of digitally generated images, in terms of *ConFIGURING the Cave* the participant's movements are sensed as they are used to affect the poses of a mannequin. In all three of these works, however different they may be, the digital and the physical work together in order to generate images and produce a particular experiential space. The mixed reality spaces of these works are produced as the machine operates based on the actions of the participant and the participant regulates her movements based on the feedback that she receives from the machine.

5.3 The Unstable Space of the Past

Ultimately, the production of space is a temporal process in which past events provide a condition for becoming. This might take the form of the past events of a user's movements sensed by a computational system, such as in *Pentimento, Bubbles* or *Intro*

Act, or the act of re-mixing source material, as is the case with *FILMTEXT 2.0.* As Jim Campbell points out, interactive media art generates relationships between temporal events by articulating a connection between the past and the present and opening this relationship to exploration via interaction.[365] In a sense, interactive media, particularly in relation to the database, may enfold multiple sections of the past within the present. Whereas film directly references the past in a static way as it presents a section of the past as an image, interactive media references the past in a dynamic way.[366] The interactive media with which I am concerned does not merely reference the past, but the past, as seen in Amerika's *FILMTEXT 2.0,* must be accessed and navigated through. The interactive artwork thus *recollects* the past and encourages a navigation of it within a thickened temporality. As well as Amerika, we have seen this previously in such works as Del Favero's *Pentimento,* Weibel and Gommel's *Flick_Ka* and Legrady's *Slippery Traces.* The machine's program connects the present, felt at each instance of interaction, to the past, manifest by film-like images, photographic images or narrative information presented via the interface.

Any interaction with a database artwork, such as *Slippery Traces, Pentimeto* or Weinbren's work *Frames* mentioned in the Introduction*,* sees the present moment of interaction, experienced as the user's movements, and the multiple levels of the past archived in the database are produced simultaneously, allowing for the thickening of temporality. This occurs as the user's movements, be they pointing at an image through a frame, walking around a room or interacting with a traditional mouse interface, are sensed by the digital system and used to trigger information from a database. In all these works we have seen that interactive media art can archive events of the past as digital information. These events must travel through the computer's program, going through a process of transformation, to be stored in the database's memory. The events are inputted into a digital system, converted into digital information and then able to be carried into the present and into a new event of interaction. To make these events actual, for the computer to recollect these events, they must go through the process in reverse, to move from the computer's database through the program, converting digital information back into an image. For example, a moving image is recorded by a camera system, which is

then digitised and able to be stored by the computer – it is here digitised by the input device. The digital information that reflects the moving image may then be made actual in another section of present as it is un-digitised by the output device and displayed.[367] Increasingly, though, it may simply be transposed into a different digital format; for example from programmed behaviour to distortions occurring to a moving image in realtime. Nonetheless whether there is a translation or transposition, this does not alter the fact that sections of presentness are being re-made. This is a simple example of the 'regurgitation' of the past by the computer in the present.

In addition to *Pentimento, Slippery Traces* and *Frames, Hello World: Or How I Learned to Stop Listening and Love the Noise* (2008) (fig. 77) by Christopher Baker is another work in which this re-contextualising of the past takes place as the system archives the past in terms of raw data. In this audio-visual work Baker presents a large-scale video wall of thousands of unique video diaries gathered from the Internet. The audio of the work oscillates between sounding the entirety of the diaries all at once and focusing on individual entries. Here the viewing present is inflated to include the multiple sections of past re-presented in the collection of moving images. Importantly though, the past events that are re-presented by the moving image are also altered by their re-contextualisation in the present alongside other sections of past. The condition of the work is produced by just this new experience of the past, as a collection of noise, displayed together in an ecology or milieu. As with Mackenzie's engine or Fuller's media ecology, mentioned in the previous chapter, any one section of past cannot be separated from the new context of which it is a part.

Figure 77.
Christopher Baker, *Hello World: Or How I Learned to Stop Listening and Love the Noise,* 2008

Furthering this example, as Campbell points out, there are more complex iterations than this that may not only capture the past to re-present or recollect it, but also interpret the past for use in the present. He points here to systems that interpret the input and store this interpretation in the computer's memory. These are systems that are used in artworks such as Rokeby's *Giver of Names* or Feingold's *Head,* artworks that do not merely log the past as raw data but rather re-present the past as they 'interpret' it. For instance, Rokeby's work uses outline and texture analysis applications to gather information about objects in the physical world. This information is not merely inputted into the system's database, but rather used to generate words and sentences that describe the computer's experience of the physical object. Similarly in *Head* it is not the words that are spoken by a user, that are sensed by the speech recognition application, that are inputted into the head's database. Rather, this information is parsed and used to trigger associative data. What is stored is not the actual raw data but rather the system's parsing of the data. Here the computer does not extract information from an input but rather generates associative data from this information. Importantly in both the example of raw data and associative data we see the present temporality is made thick as the past, either in a form that resembles itself or in the effects that it has upon the computational system, continues in the present.

Deleuze argues that there exists two distinct flows of time, that of the present that passes into a past and that of the past that is preserved.[368] Thus, there exist two possible images

that represent time, one grounded in the past and the other grounded in the present. This perhaps is the difference between the regurgitation of raw data and the generation of associative data. As the computer displays raw data, as it re-presents the past in a way that resembles itself, time is presented in an image of pastness. On the other hand, when the computer parses past information it generates an image in the present, an image of presentness that is influenced by the past, as discussed above. Let us now focus on the image grounded in the past and the way that this may cause a re-thinking of this past. The image grounded in the past is manifest in the sheets of past, the circle of past into which one must enter in order to locate a recollection-image. This is the image produced by the system that searches its database and triggers the raw data of the past; this is seen in artworks such as *Pentimento, Slippery Traces,* or *Frames,* that triggers inputted data from a database. As both Bergson and Deleuze argue, the past exists in the realm of the virtual; within the flow of duration, the present flows into the past, the actual flows into the virtual, which is preserved in its virtuality.[369] This is similar to the database that archives sections of the past, to be navigated in the present.

The interactive aesthetics of *Pentimento* (fig. 78-79) embody this type of relationship between a database and sheets of past. *Pentimento* presents several versions of the events that led to a murder at the foothills of the Blue Mountains; these 'blocks' of recognition are triggered by the participant's interaction with the work. The participant re-joins the disjointed circuits of past in order to construct a memory that is not hers, and to answer the questions of guilt and sexual morality posed by the narrative. However, this re-joining results not from deliberate cognitive processes alone, but also involuntary consequences of immersion as the viewer forgets the implications of her actions and reactions as she becomes part of, and thus affected by, the narrative flow. For instance, typically the participant would enter the room and experiment with the motion detection system, trying to work out which movements cause which narrative sections. However, the work does not operate that simply. Moving in one section of the room does not always trigger the same narrative block; the blocks that are triggered instead appear to be random. In the early stages of interaction the participant may struggle to try and 'use' the machine, focussing her attention on the way that she thinks the machine might work. Once she has

come to terms with the fact that this is elusive to her, she focuses upon the narrative, which adds to this feeling of confusion, as it is told from shifting perspectives that take the participant along multiple narrative pathways. When the user stops focussing on the machine's function, and instead attempts to make sense of the narrative that jumps back and forth in time and across multiple story worlds, she forgets to regulate her movements and instead moves in relation to the content of the narrative, her movements becoming part of the narrative. The viewer and the characters thus unfold the multi-temporal narrative together; in doing so the viewer confronts questions of her relationship to the sexual and criminal content of the work and also the way in which events such as this and our memory of them form part of our experience in the present.

Figure 78.

Figure 79.

Details from Dennis Del Favero, *Pentimento,* 2002

As a document of history, *Pentimento* seems to generate uncontrolled repetitions and disjointed blocks of narrative that tell the viewer little of the actual unfolding of events. But this is not important; it is of little consequence to this work whether the father, the son or the daughter is guilty. What is a far more interesting proposition, and goes further toward viewing histories as being generated from certain present situations, is for the viewer to ask themselves who they would prefer to be guilty and why they would wish to ascribe this guilt. This once again takes us back to the way that the past, be it in terms of historical event or data in a database, is re-presented or re-mediated or re-configured by processes in the present; in this case, the process of a participant moving in the present and initiating various sensory and cognitive processes.

Through viewing *Pentimento* in this manner a rethinking of the concept of history is possible. The peaks or present presented in *Pentimento* do not combine to form any linear sense; the memory-images that combine in the work present a narrative that is, as Bennett indicates, disjunctive and traumatised.[370] We can build upon Bennett's explanation by viewing the multi-linear re-presentations of memory, told from shifting perspectives as an assemblage of potentialities. That is, that the differences within the multi-linear recollection-images form a re-presentation of an open future and an understanding of the affective space of the events that would not be available through viewing a linear narrative alone. The multiple trajectories of the narrative allow one to experience not merely the one event that actually occurred but also the events that may have occurred had particular situations been different. For instance, the presentation of the narrative of 'guilty father' and its differentiation as 'father as victim' exist as potential histories, or in the Deleuzian sense, virtual histories. Each narrative begins from a different starting point. In one the father is murdered, in the other the father murders. Thus, as each narrative develops, all the characters have differing possibilities and take on differing roles; one can see the son and daughter as either victims or predators.

Here we come to understand the events based not merely on what happened but also what could have potentially occurred. As DeLanda states, to understand a system is not to understand the trajectory of its evolution as it actually occurs, but rather to understand how the system would behave in situations that may not occur.[371] Thus, in *Pentimento,* it is not important to understand the events in a linear sense. It is not important to construct a 'guilty father' or 'father as victim' linear narrative, but rather to understand the events as unfolding in a space filled with potentiality, filled with the virtual. The space that *Pentimento* then tries to produce is the space in which the subject positions such as 'guilty father' are put into circulation rather than assumed as either pre-existing or necessary outcomes of the artwork.

In this chapter I have examined the way in which physical and digital processes impact on the spaces in which these occasions play out. As is the case with *Bubbles, ConFIGURING the Cave* and *Pentimento* this common operation produces a type of

mixed reality space, a space in which actions sensed in the physical are converted into the digital and both allowed to play out in the one hybrid space. This production of space may also occur as in *FILMTEXT 2.0,* in which source material is re-mixed in order to construct a narrative space, or as in *Pentimento,* in which physical space and the participant's movements in this space are used to generate digital information. As has been seen, the space of *FILMTEXT 2.0* is produced by the re-mixing event, the space of *Pentimento, Bubbles* and *ConFIGURING the Cave* is produced by the common operation of the physical and the digital. Hence, the space of the digital encounter is a space that straddles the different temporalities of these events. It is a space that does not merely embed or provide a container for these events. Rather it is a space that is produced by the events that occur to it.

CHAPTER 6

The Nested Time of the Archive

...the concrete facts of nature are events exhibiting a certain structure in their mutual relations and characters of their own.

Alfred North Whitehead, *The Concepts of Nature,* p. 167

In the previous chapters I have positioned the interactive relationship established in the digital encounter as an event that at once produces a particular temporal aesthetic and a particular space in which this aesthetic plays out. In this event the temporal aesthetics of interaction are an outcome of a commingling of the occasion of a user and the occasion of a machine. These two intensities form a relationship that sets the condition for the interactive event. Overall, my approach to interaction has been directed by a concern with time. I have viewed interaction and the processes of the digital as a temporal event, in which every present occasions draws into itself past and future occasions. This leads into this chapter in which I focus on the archive of the database. Here I will examine the peculiar temporality that is felt in relation to the archive. This is a type of time that draws together many differentiated temporal occasions and puts these once distant occasions in relation with one another. As a consequence the archive of the database puts multiple and differentiated temporal occasions into contemporaneity and allows for the exchange of information. The database presents Serres' topology that sees events become multi-temporal and turbulent; or as Whitehead would put it, the database allows data occasions to prehend one another as contemporary occasions across a nexus. In short, this society of data occasions within the archive enacts the multi-temporality that marks the digital encounter.

Whitehead's concept of a nexus is important to this chapter as it allows me to theorise the elements that constitute a database. I bring this concept to bear on media art by viewing the database as made up of multiple occasions of data that prehend one another in the nexus established within the database. Through multiple processes – such as the search

and retrieval processes made possible by the database management system and the database's organisational structure, the process of inputting data, the process of the particular programming language and the process of a user enacting data retrieval occasions – the multiple data occasions may form a relationship with one another and contribute to the character of one another.

This connection between occasions within the database constitutes a nexus formed between contemporary actual entities.[372] The theory of prehension regarding contemporary actual entities has already been discussed in Chapter 4. This nexus allows information to flow between entities such that the entities achieve their character based on this information flow. In other words, the data occasions of the database obtain their individual character based upon the relationships that are generated by the particular processes that are enacted by the mechanisms of the database, such as the field codes ascribed to the data via the database's programming language and the way in which these are 'read' by the database management system. In addition to this, the data of the database is also connected to the real world occurrences that it archives and also the media content that it remediates. Historical data, for example, contained in an archive not only forms relationships with other data occasions within the database, due to the programming of the database, but also forms a nexus to the original physical event, as well as the event of inputting the data and the event of data retrieval. The data of the database thus takes form within a nexus of the digital events associated with the database's programming language and database management system, as well as the physical or media occasions that it summarises.

For instance, in a database work such as Starrs and Cmielewski's *Seeker* (2006) (fig. 80-81) any one piece of data is related to other occasions within the database as well as occasions in the physical world. This work takes place across three large projection screens, the first displaying an interactive world map, the second land formations and cities overlayed with scrolling text from news feeds relating to the large number of deaths resulting from attempts to seek refuge, and the third displaying graphical information mapping population and migratory statistics along with information that relates to the

way conflict resources such as diamonds and oil direct migratory patterns. Upon entering this environment, populated with these large projections, the participant is invited to enter her family's migratory history via a touch screen that displays a map of the world, thus entering into this evolving mapping or diagramming of migration. The participant is asked where she lives, where she is today, and where her parents and grandparents live. Through these interactive processes Starrs and Cmielewski's work emphasises the capabilities of the digital to track, organise, mediate and re-present human existence, connectivity and suffering.

Figure 80.

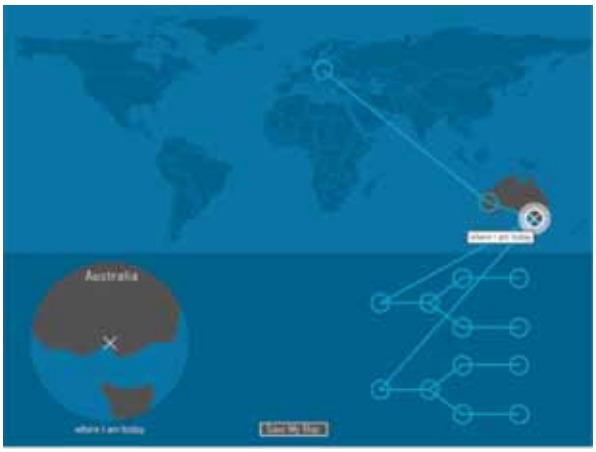

Figure 81.
Josephine Starrs and Leon Cmielewski, *Seeker,* 2006

The connection of a piece of data to an original event as well as other pieces of data is seen as information that summarises a particular migratory family history is inputted into

Seeker's database by a user as connecting nodes on a world map. This data is then put into a context with other data entered by previous users and the large cinematic projection screens and the content created by the artists. The data thus relates to an event in the physical world, as it summarises an historical event, and also to digital occasions as it is organised into the work's context. We could describe this as an art of the found object that enacts "secondary manipulations" of the object.[373] In this case the found object is constituted by the information that is inputted into the database by various participants. This involves a past event that is condensed into information, able to be managed and arranged by the database's programming language.

Let us think of the information that is entered into the organisational structure of the database as a data occasion. When interacting with *Seeker* the user inputs information into the database relating to their family's migratory history, this is one occasion that is linked to the data occasion. The information that is inputted is a summary of a past occasion that took place in the physical world, this is another occasion related to the data occasion. For instance, the participant may input into the system that her parents migrated to Australia from South Africa; this is read as data, presented as a line across a map, that does not completely capture the individual narrative of the traumatic, violent or race related circumstances of this real world event, but rather acts as a summary or a reflection of the simple factual and geographic character of this event. However, this work is not about personal narratives, rather a different type of aesthetic is ascribed to this information that conveys the trauma of a world history of migration. We see this aesthetic taking form as the information is put into relation with other data inputted previously by other users and also the information presented on the projection screens; information is here overlayed by other information in a multi-linear sense. The database constructs relationships between the multiple histories of migration experienced by multiple users, as the mapping of these migratory routes upon the world map displays the particular patterns and flows of migration. Also, the news feeds of the second screen and the data relating to conflict of the third, give the data its substantiality. They give it back its significance as a real word event that, in this case, represents one incident amongst a world history of migration that stems from the politics of trauma, racism, persecution,

capital and power struggles. The information here is not read as one individual linear narrative of migration that comes from one individual user, but rather as a multi-linear collection of data to be navigated. Here one data occasion from one user in one point in time is related to many other data occasions from many users in multiple moments in time. This is the database's multi-temporality and it is in this multi-temporality that each piece of data is contextualised.

The database at its most basic can be described as a system designed for the storage, management and retrieval of information. Because of this function, the database can also generate relationships between information. The database, as its programming language tags data with particular attributes and groups it into an organisational structure, subsequently generates relationships between data. It opens data to regrouping and reorganisation, a process of data management that alters the meaningful connections that each data occasion forms with its context.[374] The user is able to search for a particular attribute and the database management system retrieves information that matches this attribute, thus putting originally disparate data in relation with one another. This aspect of the database in essence highlights patterns immanent to the data that may have been invisible prior to its integration into a particular dataset. For instance, a database of geographic locations may organise information in many varied ways. The database may put this information in alphabetical order, or organise the information according to the meteorological information of a specific region, or organise the information in terms of population figures. These examples depend upon the specific fields that organise the data and the information that has been entered into these fields. We can see here that the database allows us to think of information outside of its usual context; geographic location becomes just one of the many ways of organising information.[375] The database is thus both a storage system and also a generative system; it both archives and assembles.

For instance, Golan Levin's Internet based work *Dumpster* (2006) (fig. 82) utilises a database and data management software to track the online romantic lives of teenagers.[376] In this work Levin accesses and analyses several web logs and gathers any entries that refer to the dissolution of romantic relationships, events in which one person is 'dumped'

by another. This data is then integrated into *Dumpster's* database and able to be navigated by a user. In this work the data is presented as red circles that bounce around the computer's screen, changing colour as they are activated. As we mouse over one circle we can see the date at which it was entered into the database, clicking on the circle reveals the actual text of the entry. By this process the information is visualised in such a way that produces a group portrait of participatory culture and composes a multi-temporal history of relationship beginnings and endings.

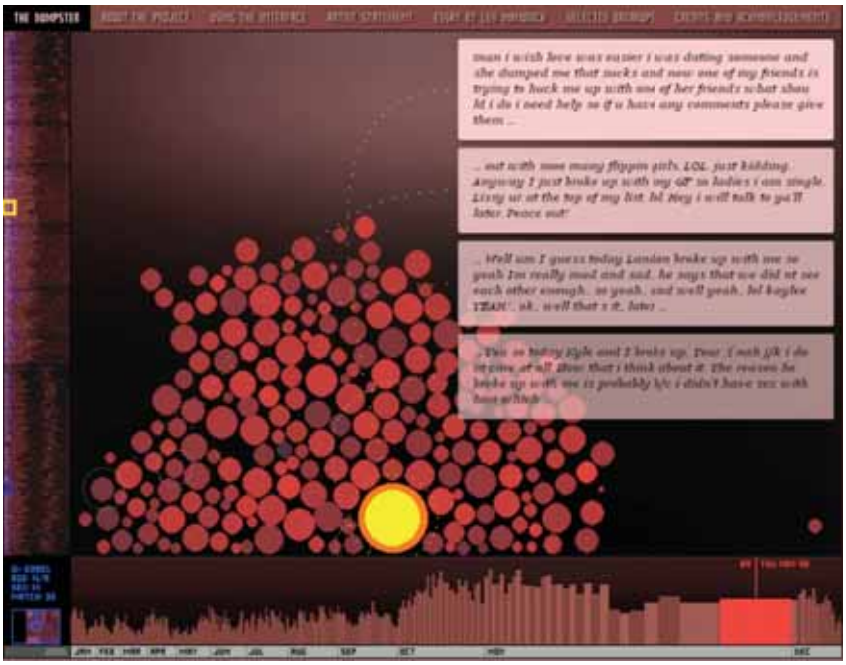

Figure 82.
Golan Levin, *Dumpster* (screen shot), 2006

As well as re-presenting the actual event, the event that sees the dissolution of the teenage romance, the occasion of the data in the database are conditioned by the computational event of inputting and organising the data. For example in *Dumpster* the data is conditioned by digital processes such as a content recognition algorithm that organises the data depending on several characteristics that can be found in the particular entry's text, putting separate data occasions into a relationship based upon their content. Here a custom built language analysis tool is able to extract information from the entries, such as who was the instigator of the break-up, was someone cheating, and does the author appear to be angry. From this computational analysis of the data relationships are

generated and data is grouped into clusters upon the screen, which re-cluster as one clicks on another data circle. The aesthetics here are not just produced by the narrative content of each piece of data but also by the way that the data is organised by computational processes.

For another example where data is attributed substantiality based on computational process, take for instance a relational database such as those used by companies to store employee data. Here relationships may be generated between data based upon specific fields. In this case the fields used may be, for example, "position title", "salary", "tenure", "leave taken", and any other information that may be relevant to the database programmer. Depending upon the operation of the database management system and the search parameters entered by a user, employees are put in relation with one another based on the value of a particular field. For instance, the database search may be used to establish whether or not there is a correlation between tenure at a particular firm and promotion, or whether employees with similar position titles take home commensurate salaries. Relationships are thus generated by the organisational structure of the database, able to handle vast amounts of data simultaneously, that may not have been apparent in the physical world. Here we see that the data occasion is given its particular character due to the programming language of the database and the analytical processes that are capable due to this language.

As Deleuze and Guattari state, often technology considers its tools in isolation; this denies the evolutionary properties of the specific territory of certain technologies. They state "…tools exist only in relation to the interminglings they make possible or that make them possible…tools are inseparable from symbiosis."[377] We can view the archiving functional of the database as an aspect of a computational tool. This technological tool must, following Deleuze and Guattari, be thought in concert with the information it contains and the relationships that it generates. This is how the temporal aesthetics of the database emerge. The database marks a particular aesthetic brought about by interaction with collections of data. The database directs the user to perform or to activate the data in

a specific manner which directly corresponds to the way in which the user comes to know the data.

In order to understand this distinct aesthetic embodied by archive art as a temporal aesthetic, I view the database through the framework established by Whitehead's concept of nesting, discussed previously in Chapters 2, and 3. This concept suggests that when we obtain the idea of a spatial point or a substance we are really dealing with abstractions; what we are experiencing in actuality is a series of processes or events extending over one another. For Whitehead, substances are just the lowest or exterior nest in a much larger nesting of volumes of processes.[378] He states that, when thinking about time, we discover that durations are nested within one another:

> We can easily see that the durations of any set…must be arranged in a one dimensional serial order in which as we descend the series we progressively reach durations of smaller and smaller temporal extension. The series may start with any arbitrarily assumed duration of any temporal extension, but in descending the series the temporal extension progressively contracts and the successive durations are packed one within the other like the nests of boxes of a Chinese toy…I will call such a set of durations an 'abstractive set' of durations…an abstractive set is effectively the entity meant when we consider an instant of time without temporal extension.[379]

This is how durations are nested within the actual world. In terms of the measurement of time, which deals with moments of time without extension, a second is nested within a minute, which is nested within an hour, which is nested within a day, and so forth. But when we consider any one of these durations without considering its extension over other occasions in other durations we are in essence considering an abstraction; we are removing the moment in time from Whitehead's passage of nature. Within this framework I view the data in the database as an abstraction made from an event in time.[380] Actual occasions are abstracted from the passage of nature and inputted into the database so that what we encounter is a reflection of the occasion. For instance in *Dumpster* the real world teenage break up, or in *Seeker* the migratory history of an individual, is reflected by the data in the database. The data is a condensation, or a mediation of an actual occasion. However, this condensation is also an occasion in itself.

It is an exterior occasion which nests within it many other occasions. In other words, the data occasions of the database contain within themselves many other occasions and reflect back to these occasions.

If we think of a database in time we can position it as a site in which a nexus is formed between the various occasions of the database and the historical physical occasions that are nested within the pieces of data. My argument here is that the data of the database is at once a part of the organisational context established by the database but also reflects back to an original occasion of the past. We have seen this in *Dumpster* as the data exists both as a data occasion in the context of the database, but also reflects back to actual physical occasion where one person was 'dumped' by another. There is a nexus here that is formed between the data that resides in the context of the database, as seen in the relationships formed between data by the database's organisational structuring and there is also a nexus formed between the original temporal events that are nested within each piece of data.

As Whitehead states in his fourteenth Category of Explanation, a nexus is a set of actual occasions that form a unity of relatedness due to their prehension of one another.[381] In our case, the actual occasions are the data occasions of the database that are put into relatedness and allowed to prehend one another by the process of the database's organisational structure and the database management system. The nexus formed in the database is a nexus between contemporary actual occasions, as the data occasions are expressed simultaneously in the database's architecture. The physical occasions that the data occasion summarises are also put into contemporaneity, as they are nested within the data occasion. Here the database becomes a turbulence of occasions, as each occasion, expressed simultaneously, represents many different temporalities and time periods. The complex data occasion also forms a nexus with the occasion of interaction in which it is retrieved from the archive. This is where the concept of time becomes complex and chaotic. The time of interaction, which is experienced by the user as a sequence of events, comes into contact with the time of the data occasion, which is a nonlinear nesting of

occasions. The present duration of interaction becomes thick as the present user connects to the nested occasions of the database.

6.1 Events and the Archive

The structure of the database may take many forms. Two of the most commonly used systems are the hierarchical model and the relational model. The hierarchical database organises information in a hierarchical structure, with parcels of information grouped within a larger parcel of information. This system, for example, is used by the familiar Windows operating system, which organises files within folders and folders within larger folders, and so forth. The relational database on the other hand organises information in a table. This database tags each piece of information with various attributes and archives the information in one cell of a table. In these systems the database management system operates in different ways. In one instance the database management system searches through folders in order to locate information, and in the other it searches the table for information with particular attributes. Both these systems lend themselves to spatial thinking. It is very easy to think of the hierarchical system as a tree and the relational system as a flat table. But this is not necessarily the way in which the computer's processor accesses the information. It may be the case that, within the hierarchical model, as a tagged piece of data is located within a larger piece of information, one occasion is nested within another. This would be inline with Whitehead; we would picture the database as a set of nested occasions. In the relational model, when we think of the information as temporal we see that the database arranges this information into a field in which multiple temporalities are present simultaneously. Both these examples of database structures enact a temporal regime outside of the traditional linear and sequential concepts of time.

To illustrate the structure of a relational database David Mair in his book *The Theory of Relational Databases* gives the example of an airline schedule (fig. 83).[382] In this example each flight that is listed exhibits certain characteristics such as flight number, origin, destination, departure time and arrival time. The information that is stored within the table of the database thus summarises a real world event by presenting certain

attributes that operate within specific domains. This is the condensation of an actual occasion of the physical world into a data occasion; the complex of occasions that constitute the flight are summarised into specific fields of data. Here the data occasion both *reflects* the original occasion of the flight and also *exhibits* its own unique character as a piece of tagged data alongside the other data of the database with which it relates. The occasion thus forms a nexus to the physical event and also forms a nexus with the other data occasions of the database.

AN IMAGE HAS BEEN REMOVED DUE TO COPYRIGHT RESTRICTIONS

Figure 83.
Table reproduced from David Maier, *The Theory of Relational Databases*

In this example the database could be asked to perform a query, which states: return the field of the number of all north-south flights after 12pm according to departure time of flight. The returned field – 214, 84 – then gives us a result which has searched a table but which rearranges the data as a relational set with specific parameters rather than as a 'flat' table. In fact, due to the parameters of the search, the set returned appears in an order other than the one laid out in the table with flight 214 leaving first at 2:20pm. Hence what is important to understand here is that the relational database while using a table does not produce relationships that are formatted by the table.

In contrast to the multiple relationships generated across the relational database the data occasions within the hierarchical database are much more restricted in their prehension of other data occasions. Because of the parent-child relationships that this database establishes, a one-to-one or one-to-many relationship is set up. This is in contrast to the many-to-many relationship established by the organisational structure of the relational database. In other words, the parent data occasion of the hierarchical database can be

related to its multiple children, but the children data occasions are only ever able to be related to one parent data occasion. This is an example of the way in which specific processes, initiated by the database's organisational structure and management system condition the potential relationships that may be formed between data occasions across the database. Relationships between data occasions are thus conditioned by the database architecture.

It should be mentioned that there do exist so called 'temporal databases' or 'real-time databases' that tag information in such a way that indicates the time at which the data was inputted into the archive and the duration for which this information is valid.[383] In these databases a timestamp is attached to each data occasion that indicates the time for which it was valid or the time that it was entered into the database. By attaching the timestamp it becomes possible for the database to store previous database states. For instance, this type of database could be used for recording population information. Using a temporal database would allow the archive to both represent both the current state as well as the previous states of the population. Due to this function these databases are used whenever it is necessary to *represent* change over time. Although this system does represent linear sequential time, it does not *experience,* in the Whiteheadian sense, this type of time. It is not that one occasion of data has the actual experience of being before or after another particular occasion of data. It is only that we, as the user, are told the time at which they were inputted into the database, as a sequence of events. This has more to do with the measurement of time and less to do with the nature of duration and the type of temporality produced by a database.

An example of temporal information organised in an archive can be seen in Matthew Belanger and Marianne R. Petit's Internet based work *Time Indefinite* (2007-ongoing) (fig. 84).[384] This work asks visitors to the site to post a description and a photograph of a particular meaningful moment of their lives. The artists describe these as moments of clarity, moments in which everything seems to change.[385] Through this process an archive is built up of meaningful moments that have occurred to a diverse number of

people throughout time. This information is available, in its archived form, to other visitors to the site and also represented in a linear sense on a timeline.

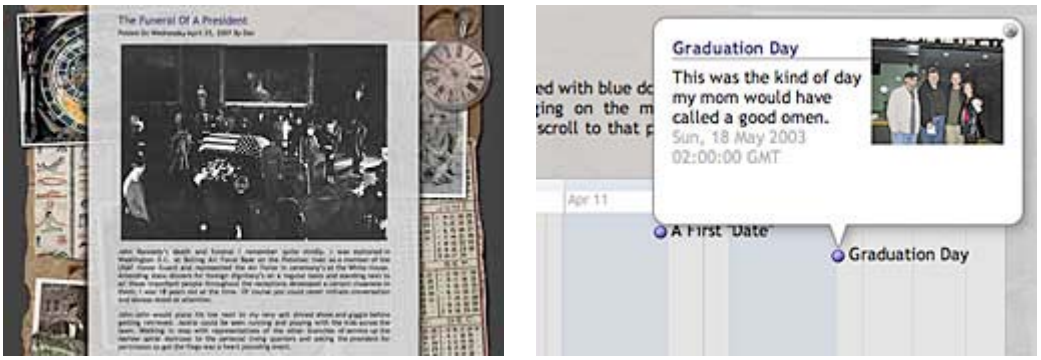

Figure 84.
Matthew Belanger and Marianne R. Petit, *Time Indefinite,* (details), 2007-ongoing

A representation of private and public memories are thus built up in which the visitor to the site is able to conceptualise the contemporaneity of these events. For instance, this is seen in the temporally close moments of "Final Moments with My Mother", the event in which a man's mother passes away as he holds her hand and "No More Curses", the event in which the Red Sox win a World Series. Both these events are meaningful for different individuals, both occur in the same temporal neighbourhood, but the events, prior to their documentation and organisation within the database had no apparent connection to one another. However, when reading these events that are de-contextualised from their original narrative and re-contextualised in the archive, they are connected, in that one alters the reading of the other. As we approach the archive as a work of art, to be read in its totality, the two very different slices of information are connected, they exchange information in a way that manifests the meaningful aesthetic event of interacting with the database. Here the archive has generated a relationship between these two previously disparate events. The relational database structure has allied two events that share a particular attribute; in this case, their position in time.

The user can also search the database of *Time Indefinite* via a keyword search. This generates further relationships between once seemingly unrelated events. The events

communicate what it is to be *in* time and to live in a world made up of meaningful events, all connected to one another, which pass with time but also linger in the present.

The way that we understand a database extends over the way we understand and organise information, both in a technological and a social sense, and further, the way we understand our experience of the world. Andrew U. Frank explains the way a specific ontology may be generated by our investment in information systems. Frank asserts that the database causes us to see, experience and think about the world in a particular way.[386] When we think of the database as spatial, our methods of information management hence create a condition where time is subordinate to space. Thus the process of reality is obscured and we experience being *out of* time. To re-situate our experience *in* time we need to be able to theorise the information systems that represent the world to us in terms of time, not just space.

As Wolfgang Ernst points out, the archive of the database affords a new infrastructure for communicating reality. Ernst points out his unease with the traditional narrative based historical discourse that purports continuity and a sort of narrative closure to history. Ernst sees an alternative to this in the archive's discontinuity and its nonlinearity.[387] Weibel also sees narrative as a reduction of the complexity of reality and information. For Weibel the database's archiving and organisational structure offers an alternative to the condensation of complex information into a narrative structure. Weibel states,

> Narration is a way to reduce complexity. When the data is too complex, when the artwork is too complex, it takes complex relationships and makes them simple. Narration is a way of representing knowledge to the dull, who are not capable of understanding things without this. For instance it is a kind of technology and technic for the inferior… The church invented the story all over the world. "Now we know everything." anyone who believes in another story is in danger. Stories are always based on past knowledge, pre-conceived knowledge.[388]

For Weibel to understand reality we must understand that there is no ontological narrative structure. Rather we should understand the world as a database, as a collection of data.[389]

The database may allow us to think about, and experience, the past through a different paradigm, but it must be remembered that this paradigm is not atemporal – it is made of multi-temporal discontinuous segments of data. It should be understood as a manifestation of Serres' turbulence of flows, as a presentness that necessarily contains the multi-temporal information of past events. The history that is presented by the database is a network of interconnected multi-temporal events. Following this, interaction with the database is temporalising; the interactive event with a database puts the user in contemporaneity with the multi-temporal information that it archives. The user becomes articulated to the turbulence of the database.

This type of thinking is echoed by Walid Raad in his work produced under the banner of the Atlas Group, a fifteen year project, running from 1989-2004, which attempts to document and archive the recent history of Lebanon. Raad explains the project by stating,

> What we have are objects and stories that should not be examined through the traditional but reductive binary fiction and non-fiction. We proceed from the consideration that this discrimination is a false one and does not do justice to the rich and complex stories that circulate widely and that capture our attention and belief.[390]

In this work, The Atlas Group assembles both fictitious and factual documents into an archive that purports to represent the contemporary history of Lebanon. This archive is located in both Beirut and New York, a selection of material is available in a smaller archive available online, as well as being exhibited in several galleries since 1999.[391] In this archive there are three separate file types, Authored Files (Type A) Found Documents (Type FD) and Atlas Group Productions (Type AGP). In these files there appear to be both fabricated information alongside factual information, bringing into question concepts relating to the stability of information, the issues of authorship and the way in which histories may be constructed from a variety of both fictions and non-fictions. File Type A are files that are attributed to imaginary authors without the user necessarily knowing that they are imaginary. For instance there are files collected from Dr Fakhouri (fig. 85), reportedly the foremost historian of the Lebanese wars.[392] These include diary entries of all the makes of cars used in car bombings in Lebanon, personal

films and other disjointed but still related information. These documents are both factual and fictitious. The events which actually took place are being narrated from a fictitious frame of reference. The images are highly aestheticised and perhaps completely fabricated, perhaps Dr Fakhouri, the apocryphal, never actually existed.

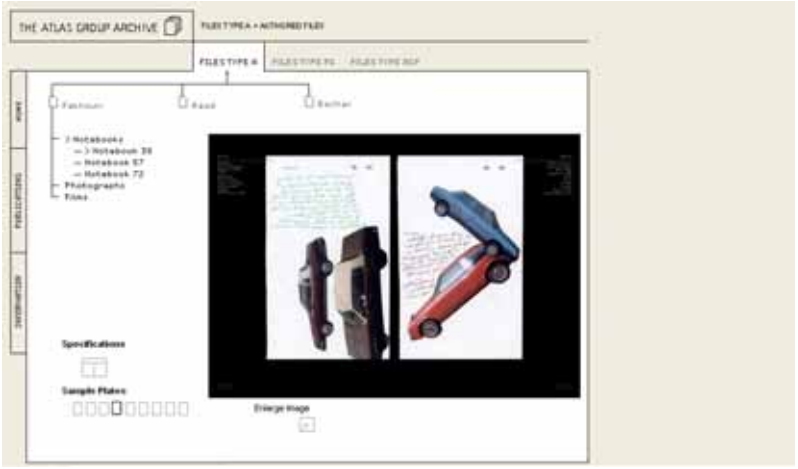

Figure 85.
Sample Page from The Atlas Group Website, Dr. Fakhouri's Notebook

In a similar mode, File Type FD are files that have been supposedly uncovered in field research, but are quite obviously fabrications, but once again based on historical fact. This includes the "Secrets File", a set of six photographs, found buried thirty-two metres under the rubble produced during the 1992 demolition of Beirut's commercial district (fig. 86). These photographs are all the same size and all saturated in different shades of blue. The Atlas Group reports that when these images were sent to a laboratory for analysis they discovered small black and white images embedded in the blue. These images were photographs of the many people that have been found dead in the Mediterranean Sea from 1975-1992.[393] In addition, this File Type contains video footage, supposedly sent to the Group by a Lebanese Army Intelligence Officer, known only as Operator #17 (fig. 87). This footage is intended as surveillance footage of a known meeting place for spies, but as this footage shows, at the same time every afternoon the operator diverts the camera from its intended function to simply film the sunset.[394] These are clearly fabricated documents, but, as the Atlas Group points out, whether fictitious or

not, they still communicate something of the condition of the contemporary Lebanese experience.

Figure 86.
An example of the found photographs in File Type FD

Figure 87.
Still from the footage from Operator #17

File Types AGP contains documents and footage produced by the Atlas Group. These include files such as the "Sweet Talk File", a document in which the Atlas Group reportedly recruited dozens of Lebanese citizens to photograph their environment as well

as the "Thin Neck File", a file that documents the history of car bombings in Beirut since 1975. This File Type, along with Type A and FD, contains film footage as well as written and photographic information. The files in general represent various historically significant events that represent something of the history of contemporary Lebanon, particularly relating to its civil wars. The varied media used to represent events, also represents, or mediates, historical time in varied ways. In total, the archive of The Atlas Group is made up of various sections of history, in each of these sections historical time is mediated through the act of documentation and archiving.

In The Atlas Group's work, narrative occasions and database occasions extend over one another in the interactive event. As Iwona Blazwick points out, the assemblage of found images or texts, or the documentation of events, within the archive taps into the history of the collage.[395] In the relationships formed between the segments of information abstracted from their original context, narrative information is generated. In the archive, as Blazwick points out data, and subsequently meaning, is extracted from the information that is presented chaotically, without a hierarchical order. It is in the relationships formed between the chaotically presented segments of information that we find this narrative. This narrative meaning comes from conflict, from the collision of one piece of information with another.[396]

As events collide the time of these events also collide. In the archive time is not presented as it is in the montage; time is not presented as a sequence of occasions, however juxtaposed. For instance, in Marker's work *La Jetée* discussed in Chapter 3 time is signalled by the montage's sequence of photographic occasions. Although this presentation is complex as the occasions move forward and backward in time, it still constitutes time as a sequence of events. In contrast, the time of the archive, as seen for instance in The Atlas Group, does not reflect time as a sequence of events but rather as a thick collection of data occasions. As already stated time is presented as a nesting of occasions. In the viewing present, the archive presents us with multiple durations simultaneously. The time of the archive is divorced from the notion of linear progress.

Rather time loops, it repeats, within each section of present. In essence the archive carries forward sections of past that are continuously repeated in the present.

In the archive of The Atlas Group, which is used as a generative representational device by the artists, linear narrative time is subsumed by archive time. Events are not presented in a linear sense; we are not presented with history as a readable sequence of events. Rather history is presented as a complex of data, chaotic and interconnected. Time is thus presented as differential; it is not set out on a timeline of events, but is generated as we access different information and different media. We see the representation of history in the film footage, as set out in a sequence or a montage. We also see history reflected differently in terms of diary entries and found photographs. This hypermediation of time, to extrapolate upon Bolter and Grusin's term, brings to light the conditions of the temporal.[397] Namely, we become aware of the chaotic nature of time in any given moment.

As set out in Chapter 2, Serres' presentness is the condition produced by a complex of turbulences. This means that any section of present, because it is made up of a complex of past and future events, is to be understood as a manifestation of temporal flows and eddies, both forward into the future and back into the past. Time is not linear, but multi-linear. It extends, at any moment of presentness, into past and future events; it contains elements of these events within itself. The database is the domain of presentness *par excellence*. It is a complex of temporal information, every event having the capacity to relate to every other event. Every piece of data may potentially form a nexus and exchange its information with any other piece of data. As we access a database, we access information flows, generated by the archiving and triggering capacity of the database. In essence, we access a turbulence of flows – we access Serres' chaotic presentness.

Time is ineluctable; it is not that we obliterate time by introducing archiving and retrieval technology, it is just that the new technologies and techniques of organising and accessing information may open new experiences of time. The technologies and

techniques construct a specific way of operating in time. If we move beyond the spatialisation that has dominated our thoughts about databases and the storage of information, we can think of time within the archive as prompting a radically new experience of the temporal, in which our navigation of the database amounts to the navigation of multi-temporal discontinuous information. As stated in Chapter 2, the navigation of the multi-temporal events of an archive can be understood as navigation sideways through time.[398] The user, as they navigate a work such as Belanger and Petit's *Time Indefinite* navigate sideways through the various temporal information contained within the archive.

This can also be seen in works mentioned earlier such as Legrady's *Slippery Traces* (fig. 88), in which the user crawls through the temporal information of the database by activating 'hot spots' in various postcard imagery. In the Deleuzian sense, each potential image that a 'hot spot' may link to is folded into the present image. For instance, in the image below, rolling over the image of the beach ball will cause the database to generate another image. As already mentioned, the system is not pre-programmed to display a particular image when this 'hot spot' is activated. Rather, the 'hot spot' may link to one of several images. This is because the system decides which image will be triggered based on the images that the user has triggered previously.[399] The potentiality of this image and its relationship to the present image is enfolded in the image of the beach ball. This is an example of digital processes actualising the virtual. This concept was previously discussed in Chapter 4, as a potential that is embedded within the actual image. We can understand this as a nesting of many occasions within one occasion. The postcard image nests many other potential images within itself.

This nesting of occasions in a single moment of the present is also enacted in Courchesne's already discussed *Portrait No. 1* (fig. 89). In this work the user accesses information from the database through their interaction with the image of Maria, as her various responses are archived within a hierarchical database. Again, each potential response to the user is folded into the data occasion at the present moment of interaction.

Figure 88.
George Legrady, *Slippery Traces* (detail), 1997

Figure 89.
Luc Courchesne's *Portrait No. 1,* 1990

In order to propose a theory of the multi-temporality of the database, this type of time must be theorised at the axis of the physicality of interaction and the digitality of the database. It is only through the intersection of database structures with the real world occasions of our day to day lives that we can come to understand a database *in* time as a complex of turbulences, as a society of actual entities. The database is necessarily related to the physical events that surround it. The time of the events of the database of *Portrait No. 1,* for instance, are connected to the time of interaction in which they are realised. Maria's potential responses to the selections of a user are immanent to each moment of interaction. As the user makes a selection from one of the three choices available on the interface's menu one of the three possible processes are initiated. These events repeat throughout the process of interaction, each time being played out in a new lived present. At any point the potentiality of the database, as it intersects with the lived present, creates a thickening of that present. The actual image that is displayed, and the temporality of that image, becomes inflated. This is because in every moment of interaction are all the other potential images that the database may potentially trigger.

The structure of database time is complex. The archive of the database is made up of information from different times. The database is thus a collection of temporal information, representing differentiated or turbulent temporal flows. Take Legrady's already mentioned *Slippery Traces* (1995) or *Pockets Full of Memories* (2001) (fig. 90) as examples. In both these works the archive is made up of information and images collected at different times and of different durations. In the case of *Pockets Full of*

Memories, a work in which each participant is responsible for scanning visual information into a database and assigning certain fields to the scanned object, we can see multiple temporal information that is entered into the database presented as multi-temporality. The data occasions are then able to be searched and put in relation with one another based upon the set fields.

Legrady's work utilises a Kohen self-organising map algorithm to organise the data, according to the similarities as defined by the user's textual descritions.[400] This map algorithm moves the images on the screen into an organised state, with the viewer able to see the object's movement over time, and thus see how its substantiality and its context has been altered by computational processes. Importantly, in this work, at the beginning of its exhibition, the database is empty, it grows through the duration of the exhibition, in order to arrive at a final ordered state at the end of the exhibition. Thus, the archive logs a particular period of the past, generates relationships between this information and presents it as a collection of pastness in the present, at the end of the exhibition's duration.

The archive is here made up of various temporal information, reflected in the data occasions scanned into the database, themselves reflecting different moments in time. The work presents a turbulent type of time as these data occasions are presented all at once upon the projection screen. A multitude of temporal information is thus presented instantaneously. Events that were once distant in a linear model of time are now proximate through their mutual entanglement in the database structure. As already mentioned if we are to think of a database time we cannot think of a linear temporal structure. Database time is nonlinear, non-directional and multi-temporal. When thought of in a Deleuzian and Whiteheadian model of time, the addition of this multi-temporal duration to our ordinary everyday experience of temporal flow can be pictured as a thickening of duration in which the experience of presentness is complicated by the addition of numerous and turbulent temporal information.[401]

Figure 90.
George Legrady, *Pockets Full of Memories* (projection detail), 2001

In *Pocket Full of Memories* objects brought to the gallery by a user, objects that one might have in their pocket, can be scanned into the database. Examples include: mobile phones, handkerchiefs, food wrappers and so on. Information from the material world, which was actualised from a vast collection of potential, is now stored in the database's collection of information. This information then waits in the database to be actualised by another event of interaction.

Every object that is contained within the archive of the work is a reflection of the original occasion at which it was scanned into the system. The work is thus a collection of data occasions that link to past physical occasions, housed within an archive. These data occasions are then able to be accessed via the projection screen and seen as clusters of visual information. The aesthetic event of *Pockets Full of Memories* occurs as the physical objects and user initiated occasions intersect with the functionality of the database. The database takes information from the outcome of human action, the software then arranges this information due to the tag ascribed, and displays this information alongside information with a similar tag. When made visible via the projection surface, each data occasion is changed due to those other data occasions that it is clustered with. Thus, experience emerges from *Pockets Full of Memories* as the condition of 'userness',

reflected by human movements and decisions, is meshed with the database and the software.

6.2 A Database *in* Time

The database can be thought of as a society of actual entities. We must remember here that an actual entity is not a thing but a process. As Halewood and Michael point out "Whitehead's theory of actual entities is designed to account for the reality of 'stubborn fact' within a universe which is characterised by continual process."[402] But, it is obvious that these actual entities are not those things or objects that we encounter in daily reality. Rather, these visible things are the outcomes of actual entities. They are the products of the process of reality. This approach is important because it firstly situates process as the primary category of existence and secondly asserts that objects are constructed based upon the becoming of actual entities. Hence, those things or objects that we encounter in our daily reality are to be thought of as societies of actual entities. They are the outcome of the temporal extension of actual entities into a society of process. The database is just this society. The database that archives and generates relationships between these entities can be thought of as a site of extension, it is a society of actual occasions that all extend over one another and all prehend information from one another.

But the database does not change in time in the same way that we are accustomed to think of occasions changing. Whitehead explains the way objects that seem to be eternal, or that seem to exist unchanging, are to be thought of as actual entities – and more forcefully, as events. For instance, Whitehead has famously described The Great Pyramid as an actual entity, as an event in time.[403] Whitehead points out that objects that we traditionally consider as eternal, such as the Great Pyramid, or in our case the database, are in fact societies of actual entities invested in the process of events and the passage of nature. Whitehead asserts that when we think of an event we are accustomed to think of a melodramatic occurrence, for instance a man being run over by a car. [404] This example is an event that occurs in a certain spatio-temporal limitation. We are not however accustomed to thinking about the Great Pyramid's endurance through time as an event. But, as Whitehead points out, this is the only way to meaningfully view the Great

Pyramid in a process philosophy. The Great Pyramid, and all the life and nature within it, is involved in a process of events.[405] This may provide a means to develop the concept of actual entities vis-à-vis the database. If The Great Pyramid can be thought of as an occasion in time then so can the database.

Whitehead points out that The Great Pyramid is an *object* that is connected to *events*. But, importantly, it is these very events that constitute the object. The object, following Whitehead is out of time, while the events that it connects to are in time.[406] In this sense, the flow of events that surround The Great Pyramid are in constant process but the object that is recognisable as The Great Pyramid remains unchanged. The existence of The Great Pyramid, and perhaps the database, is brought about by a state of flux and permanence.

This provides a method to think about the database as an actual entity; it may be that the database can be positioned as an object that exists as a society of actual entities, derivatively *in* time, by reason of its relation to the actual events that occur throughout the process of interaction. For instance, through the process of interaction with the already mentioned database work *Time Indefinite,* the information of the database becomes an actual occasion. As a user either inputs data or enacts a process of data retrieval, the information of the database becomes a data occasion that is put in relation with other data occasions and also with the physical occasions of the world. This is an example of *process* actualising *relationships*.

For Whitehead, as for Deleuze, all elements in the universe are involved in a process of becoming; every actual entity is remade at each instant of duration. As Whitehead states, "…the actual world is a process and…the process is the becoming of actual entities."[407] Therefore, in order to situate the database, through a Whiteheadian paradigm, as *in* time, it will help to situate the database as an actual entity, or more precisely a society of actual entities. This move will invest the database within the process of reality.

Whitehead's concept of actual entities has previously been described in Chapter 2, but it is worthwhile revisiting and furthering that definition in relation to the database. Whitehead's actual entity has been read by others as anthropocentric. For instance, Johnson describes an actual entity as the momentary experience of a subject or a self at one instant of duration. [408] For Johnson, the environment of the present moment is only important in as much as it provides data for the prehension of the actual entity. But Whitehead's actual entities need not be read as denoting a subject or a self. As Whitehead states, "actual entities are the final real things of which the world is made up."[409] Here Whitehead refers to the quantum processes of nature. Whitehead is not discussing material things but rather, when talking about actual entities, Whitehead is discussing the *experience* of atoms and electromagnetic fields and also the *experience* of objects and events that these things combine to constitute. It is the term *experience* that is important here. An actual entity is experience, it is a process or an event of becoming; an actual entity is not an unchanging object or thing. Objects and information take on the appearence of being eternal as information survives through the process of one actual entity, as it becomes present, prehending the actual entity that came before it. An object in duration, following Whitehead, can only be thought of as the nexus of many actual occasions in time. The individuality of each actual entity is merged together in the unity of the extensive plenum, thus giving the impression of the object and its events in time.[410] As one actual entity dies off to make room for the next, the new actual entity receives information from the old actual entity.[411] This is the illusion of eternal information. Actual entities are not eternal; they are remade at every instant of duration.[412]

Hosinski elucidates the matter further by pointing out that while an actual entity can be thought of as a "slice" of human experience it is also to be thought of as the present moment of experience of every other element that goes to make up the universe. Hosinski states,

> if we can think of a human life as a series of moment of experience stretching from conception to death, and if we take a cut or slice through this life we will encounter a single actual entity, a single moment of experience. This single moment is complex, because it bears within it relationships to all the

> moments that occur before it and all the moments that occur after it in that persons life.[413]

For Whitehead, as for Deleuze, the event of the present is made up of a complex of temporalities. Hosinski also points out that just as the subject's present moment of experience is an actual entity so is the present moment of experience of every electron, neutron and proton in every atom throughout the entire universe. This philosophy positions the organism as perpetually engaged in a process of becoming through its manifestation as a complex of actual occasions. In order to situate the database within Whitehead's frame we need to be able to view the database as a system constituted of interdependent slices of experience that react to one another as well as outside information.

If we think of the database as an organism, as a collection of elements that work together in order to generate relationships and information, we see the database's function as more than merely archival. The database provides the condition for relationships to be formed and events to occur between once disparate information. Each piece of data archived within the database contains elements of every other piece of data. This can be thought of as a prehension between actual entities. As I have pointed out, for Whitehead actual entities are connected to each other in time by the process of prehension; the process whereby an actual entity grasps information from a previous actual entity and uses this information in its own becoming. In other words, actual entities form a nexus with one another in order that concrescence may occur. [414] This occurs differently in the database. The database puts actual entities in contemporaneity with one another, rather than in sequence. The actual entities are not set out in a uni-temporal order, rather they are entangled in a multi-temporal hierarchical structure.

6.3 The Database and Temporal Relationships

For Whitehead, as well as DeLanda, as pointed out earlier, there exist infinite levels of duration.[415] Durations are infinitely large and infinitely small, and enfolded or nested within one another.[416] Any event in the smaller section of duration is connected to the events of the larger duration; this is Whitehead's extension, drawn to our attention by

Deleuze. Here, one element is stretched over the following ones. Deleuze states, "the event is a vibration with an infinity of harmonics or submultiples."[417] In other words, the event is made up of a multiplicity of actual occasions, all 'sounding' together. If we think of the database as an event we can picture it as a site of extension, in which all the data occasions that it archives may potential extend over one another. In this model the time of the database is constituted by the data occasions that are nested within it and the outside occasions that are condensed within these data occasions. In short, database time is a multiplicity of nonlinear nested durations.

We can work this theoretical approach through a database artwork such as Legrady's already mentioned *Pockets Full of Memories.* Here the organisational structure of the database brings together multi-temporal information, as various objects scanned into the system over time are simultaneously displayed on the installation screen. The objects are temporal in that they mark a particular point in time in which a participant has scanned her image and inputted this into the database. The objects, such as a plastic wrapper, a hand, a set of keys, are the condensation of the event in which these objects were inputted into the database, the event of going to the gallery, seeing the work and interacting with it. The multiple temporal events, condensed into the data occasions, are nested within the database's overarching structure. The database can thus be pictured as a container that is the site for the extension of data occasions, or to use Deleuze's metaphor, the database can be thought of as a tone made up of the multiple harmonics of each data occasion, organised by the afore mentioned map algorithm.

This can be seen in the generative capabilities of archival systems. In a work such as Muntadas' *The File Room*, an installation and ongoing Internet project which archives events of censorship, relationships are generated between originally disparate events.[418] In this work the user searches a database that is made up of information relating to the censorship of things as diverse as Baudelaire's *Les Fleurs du Mal*, Mapplethorpe's 1989 retrospective exhibition and The Rolling Stones' censorship in China. The user can search this archive using the fields of medium, grounds for censorship, date or location. Depending on these criteria, different relationships are generated between different works

and events. Every occasion of the database is connected to every other occasion. These connections remain virtual until the database is accessed. When this happens, the database's particular tagging architecture and its search and retrieval mechanism generates connections between sections of information. Firstly, all events that are embedded in this work are connected by the criteria of censorship. The act of archiving this multiplicity of events has generated a relationship amongst these diverse events. As two events are accessed they form a connection, a link or nexus is generated between the two as the database arranges them into a hierarchy such that one cannot be regarded without reference to the other.

We can begin to think about database time by thinking about the information that the archive of the database contains. Prior to information being tagged and archived in the database of, for instance, Muntadas' *The File Room* the information took place either in the physical world or as a media event. The original event, following Whitehead's definition of an event, occurs in time and extends over other events that occur simultaneously within the duration of the event. The database then archives this data.

As Whitehead states, "nature is known to us as a complex of passing events."[419] In relation to this statement, we can see that the database captures and compartmentalises these events, in essence separating them from the events they may be related to via other means of spatio-temporal organisation, for example, through the archiving of film footage outside of its usual context or sequence. The database then can be said to archive these occasions and put them into new relationships with the other information of the archive. As already pointed out, the database of *The File Room* puts events of censorship in relation with one another depending upon the specific fields of medium, date, grounds for censorship, location or a keyword search initiated by the user. In relation to time, events that were once unrelated in terms of the temporal position in which they originally transpired are now able to be experienced as contemporary within the database. The database has thus carried forward multiple temporalities from the past into the present. When the database is searched the past becomes re-actualised or re-thought in the present. This occurs in terms of the relationships set up by the database's process of data

organisation and the interactive process between user and the database management system that enacts data retrieval based upon specified search criteria.

As Mary Ann Doane points out, the possibility to decontextualise marks the current media context.[420] But this decontextualisation of information does not deny it connections with other information. Rather, the act of archiving information in the database's organisational structure generates relationships within that structure. In a Deleuzian and Guattarian sense, this is the database's ability to deterritorialise an event or information. For Deleuze and Guattari the process of deterritorialisation is a process of becoming other, a process of following a line of escape from a particular territory or way of operating or thinking.[421] The database is able to provide the means for information to be used outside of its original territory and thus ascribed new meaning and new modes of being. The information's meaning is no longer bound to the territory in which it was first uttered.

But, as Deleuze and Guattari state, with deterritorialisation always comes a reterritorialisation.[422] This reterritorialisation is manifest in the new relationships and new information that may be created as a result of the particular piece of information being able to be called upon from the database. As such, milieus and organisational structures are not staid and stable; they are rather dynamic and unstable, always potentially shifting information and relationships. The information of the database's meaning is now bound to its current territory, a territory in which relationships are generated between information depending on the particular tagging architecture of the database. The meaning of information is now bound to the potential information, stored in the database, which may be triggered alongside it. The process of deterritorialisation is thus a generative act as it initiates a reterritorialisation which generates relationships throughout this new territory of the database. Through this reterritorialisation within the relational architecture of the database the information has become a data occasion.

To understand data occasions as condensations of events we must first understand physical events in terms of a hybrid extension of occasions, not as a linear progression of

occasions. For Whitehead, every actual event is related to all those other simultaneous events. To be temporally simultaneous is for an event to occur directly or locally before or after a specific event. This can be seen in the well-used example of the musical melody. The experience of the melody is not constituted by the individual and compartmentalised experience of each specific note. On the contrary, the experience of the melody, or, in a Whiteheadian sense, the event of the melody, is a flow of information that moves through each note.

In terms of the melody line, we should think of each note as simultaneous in time to those notes that come directly or locally before or after the note. This is the concrete flux of information. In this example it is easy to see that the melody is made through the act of each note drawing meaningful connections to those other notes that occur simultaneously. Because of this connection the temporal duration of any one instant does not just contain that specific note that is sounded at that instant, but also the others that transfer their information through the note. However, this phenomenon and the relationships that are actualised are much more complex than this. The notes in the melody line are not just connected to each other but also to every other event with which they are contemporary. This includes things such as the events associated with the performers in the orchestra, the audience, the lights, the seating arrangements or the recorded media through which the melody plays or the means through which the melody is disseminated, through broadcast media for example, and everything else that goes to make up the context and framework for the piece of music. The concrescence of all these things felt through the duration of each note makes up the particular experience of the single melody line.

We can use this temporal logic to examine the database. The database archives information that occurs as events in the actual world. Every one of these events is disconnected from actuality and stored in the database as data. But prior to this, when the data was a part of a larger actual event, it established connections to those other events that occurred simultaneously in time and in space and constituted a larger event. We can think of the data as a note within the melody line, which has been abstracted from its

original location. This note is a condensation of the original melody, it nests within itself other notes that are unactualised.

The data occasion is both a condensation of the original occasion and an occasion that now carries with it various other digital and data occasions. We can think of the data, as a condensation of the initial event, as the lowest rung in the chain of events, or as the external Russian Doll. But the data occasion achieves a double sidedness within the database. It is both representative of the original occasion and simultaneously becoming a new occasion as it prehends the other data occasions with which it finds itself inside the database. The data thus establishes new relationships with other events, as it extends over and prehends those other slices of data that it is nested with inside the database. For instance, in Legrady's *Pocket Full of Memories* objects that were once in individual storage containers – in other words, pockets – become deterritorialised from this context and from the individual and her memory and reterritorialised as a collective pattern of memory that is visually gridded and subject to constant reassembly as a result of data input events.

This chapter has positioned the database as a complex society of actual entities. The temporality of the archiving structure is found in its extension over the events it contains from varying temporal durations. In other words, the duration of the database contains other multiple durations of a smaller scale. These durations are not arranged in a linear series, as we traditionally experience them in the every day. Rather these multiple durations are organised in a hierarchical structure. This act of archiving, that places multifarious events in simultaneity, results in a multi-temporal regime. The database exists as a multiplicity of actual entities from diverse temporal neighbourhoods. These actual entities, when the database is navigated and re-sorted, are experienced as a turbulence of temporal events, all occurring at once, accompanied by their virtual out-of-field as well as those virtual relationships generated by the archive. Through viewing the database through this temporal framework we can see that the database instigates a thickening of duration, in which every event of presentness is inflated with other virtual events and virtual relationships.

CHAPTER 7

Developing a Temporal Aesthetic: Time, Databases and T_Visionarium

Time is paradoxical; it folds or twists; it is as various as the dance of flames in a brazier – here interrupted, there vertical, mobile and unexpected.

Michel Serres, *Conversation on Science Culture and Time,* p. 58

As has been shown throughout the preceding chapters, digital technologies make possible a re-examination of time. For instance, in interactive narratives, 'VJing' or audio remixes that are made up of samples and loops, the timeline of the original narrative or composition is segmented, tagged and archived in a database. Either the artist or the user activates these slices of the larger time of the narrative or composition, out of the original temporal context, in order to create a new narrative or musical timeline.[423] Both the artist and the user are able to experience the time of the archived narrative events as a simultaneity of events open to re-organisation in the present. In the following discussion I further this concept by positioning the time of Del Favero, Shaw, Brown, McGinity and Weibel's immersive artwork *T_Visionarium* as thick with the database's differentiated temporalities. The duration of the present becomes thick as the database archives segments of events from various and specific times, and carries these into the present. This is experienced as a simultaneity of events, all contributing to the experience of Serres' presentness, as the purpose designed software of *T_Visionarium* opens its archive to searches, navigation and recombination. The database, thick with temporalities, moves through time and initiates a complex of turbulences between past and present. In the database, as argued in the previous chapter, time is a complex of turbulences; an event which pulls together temporal occasions in pleats of time. [424] Occasions that were once thought of as disparate along a linear timeline are now proximate in the nonlinear time of the database.

Through an analysis of *T_Visionarium* I propose to indicate how interactive artworks, driven by database logic, offer up novel experiences of time.[425] Of course this is not just the case for *T_Visionarium* but it can also be said that other media open up novel experiences of time for viewers and interactants. This will be examined throughout this chapter by looking at other examples from media artists such as Masaki Fujihata, Candice Breitz and Mark Amerika. *T_Visionarium* is used as the major case study in this chapter as it provides an example that enables the examination of both interactivity and a database aesthetic. Both these qualities of the digital encounter have been major concerns of this thesis. In terms of *T_Visionarium* I am interested in positioning the human user as inextricably caught up with the temporality of the machinic system in the interactive encounter.

Weibel, one of the work's creators, provides a way to think about the event that is commensurate with the temporal aesthetics theory developed in the previous chapters. In an interview that I conducted in 2007, when asked about the way in which databases may allow us to re-think narrative Weibel stated:

> …the story is like a river, but in fact when we look closer, there is no river at all, because there is no Danube, because we have so many other smaller rivers coming into the river. So maybe we have, say 10km that is the Danube, but the rest is a network of many, many other rivers. There is not even in nature a linear construction, no linear time-line. Because on all sides we have other smaller rivers coming together; there may be a main river called Danube but the river is a network…it was not Napoleon, it was not Hannibal, it was a string of events which made things happen. It wasn't Hitler it was a stream of events. But it is very easy to say that Hitler is responsible and that we can only blame Hitler.[426]

Weibel's analogy helps us to think of interaction with a database as a complex of events that extend over one another. For Weibel the world and our experience is to be thought of as a network of events and to attempt to condense this into a linear narrative is an act of reduction. Linear narrative, for Weibel is a way to make complex events simple.[427] The events, denoted by the Danube, Napoleon, Hannibal and Hitler are outcomes of the

extension of actual occasions. They are the result of a flux of events; a network of actual occasions that can only be understood as a complex of processes.

Weibel's sentiments are similar to Heraclitus' famous statement which I continue returning to; "you cannot step twice into the same river, for other waters and yet others go ever flowing on. They go forward and back again."[428] For Heraclitus, and the process philosophy such as Whitehead's that follows, it is the process of the flow of water that constitutes the river. The river is at once permanent but also in flux; its water is always changing but it is in this flowing water that the river achieves it permanence. Also, for Heraclitus, the river and the human are enfolded in the one event of permanence *and* flux. Every occasion that makes up either party is invested in a moment of interrelationship; neither is a figure of permanence throughout time, both change based on the connections they form with one another over time. This is also how the digital encounter manifests. The digital is articulated through its processes of code and the asynchronous transmission of information. This idea of a 'subject' or a 'user' is also constituted by the process of flux as they are characterised by each event of interaction and the transductive relationship that they form with technology. Thus, just as Heraclitus cannot step twice into the same river, neither can the user interact twice with the same machinic system.

7.1 *T_Visionarium,* Technology and Interaction

T_Visionarium is an interactive immersive environment realised within the purpose built Advanced Visualisation and Interaction Environment (AVIE) (fig. 91), a three hundred and sixty degree visualisation and auditory environment that encircles the participants.

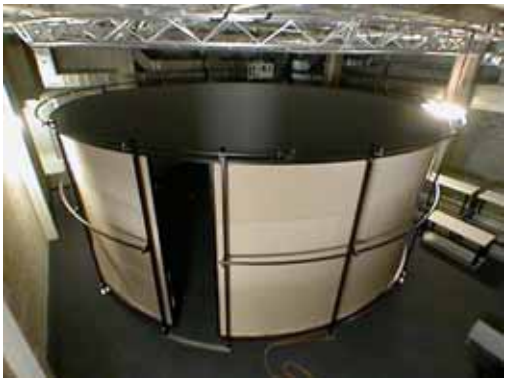

Figure 91.
iCinema's Advanced Visualisation and Interaction Environment (AVIE)

T_Visionarium has recordings taken from twenty-eight hours of Australian television, encoded by a content recognition algorithm, and stored in its database. Selections of these media clips are made visible on the substrate of AVIE and subject to the user's navigation. Once the user selects a particular moving image from those displayed, the surrounding television clips cluster around the selected clip, due to the tag ascribed to them by the content recognition algorithm, in a hierarchy of relationality; those with the strongest relationship to the thematic and visual characteristics of the particular images cluster around the image, while those with weaker relationships shift away from the image, behind the viewer. After the reassembly of the audio and visual information is completed the clips either loop in a short duration, based on the temporal length of the specific shot, or can be played in a linear fashion. Also, windows may be dragged on top of one another, which cause the clips to be combined into one window and played back to back. This allows the user to select and create a linear, yet still somewhat disjunctive, narrative that rapidly jumps from one section of time to another.

Throughout the duration of interaction new images are triggered from the database and displayed on the substrate of AVIE. There are two hundred and fifty windows clustered around the projection surface, whose contents change throughout the process of interaction. After ten minutes within the immersive environment the user would typically see approximately one thousand media images. As the user selects one image with the hand held interface, new images are triggered and clustered based on their relationship to the image selected. For instance, if the pre-determined qualities that the content

recognition algorithm was programmed to search for were values of colour and emotional content within the particular clips and the user selected an image that was predominately light coloured and heavily violent, then, theoretically, all the images with a high affinity to this would be triggered from the database. These images would replace the previous images in the finite windows. The viewer thus navigates through the images, in doing so, navigating through the time of the images, forming lines of relations between images and times where before none existed. A type of ecology of the image and ecology of temporality is produced in which the interrelationship between the various media images and the interrelationship between the multiple representations of temporality are brought to the fore.

Figure 92.
Del Favero, Brown, Shaw, McGinity and Weibel, *T_Visionarium* (installation detail), 2008

This ecology and the level of immersion provided by AVIE overwhelm the participant with visual and auditory information, most of which is either incredibly banal or so far removed from its context, both temporal and cultural, that it has been rendered incoherent. It is as though Serres' conception of presentness as a complex of chaotic turbulences has become manifest inside AVIE. *T_Visionarium* thus provides an absolute overexposure to the banal, the violent, and the abstracted that results in both the original theme of the TV clip and its temporality being conflated with all the other clips (fig. 92).

The themes of the television images are confused as the separate images fail to link into a coherent narrative. This undermines the logic of the original televisual medium by

exposing at once its methods, the limitations of these, and its artificiality. Television's re-presentation of the world, following Weibel's already mentioned sentiments, is undermined by *T_Visionarium* as it presents the various representations of the world as a confusion of archived information that are turbulent, multi-linear and chaotic.

T_Visionarium presents its multi-temporal information as clusters upon the projection surface of AVIE. Each change to the substrate of AVIE constitutes a change to the nature of the immersive environment, and this is conditioned by the user's responses, both cognitive and habitual, to the encounter with the previous state of the immersive environment. The two systems interrelate to constitute this event; they in a Whiteheadian sense, prehend one another. The human and the immersive environment can thus be thought of as an ecology. It is this ecology that is the extension of one entity over another, a relationship in which one actant affects the other but is also likewise affected. The human user affects the appearance and process of the digital environment, but likewise the digital affects the human.

The functioning of *T_Visionarium* also brings to light a certain ecology of two distinct forms; the linear narrative structure of TV are brought into relationship with those associated with the hierarchical database structure of the digital. The transcriptive narrative exists as the integration of the temporal characteristics of narrative and the multi-modal characteristics of digital information. *T_Visionarium* can thus be understood as a process of events that occur as the consequences of the transportation of multi-modal information across time.[429] When *T_Visionarium* is viewed this way it is apparent that the work is made up of narrative events constituted by their relationship to a database structure. The narrative that emerges from *T_Visionarium* is largely constituted by the work's technical specifications, for instance its algorithms, its database architecture and its display and interaction design, rather than its aesthetic content. In other words, the narrative that emerges and the aesthetic of the collage of media images is emergent in the technological processes that occur behind and at the interface. It is the process of interaction that is important, not necessarily the content of the windows actualised on AVIE's surface. As Hansen points out, "the image can no longer be restricted to the level

of surface appearance, but must be extended to encompass the entire process by which information is made perceivable."[430] Digital interaction here produces aesthetic events, rather than an aesthetic object.

The user of *T_Visionarium* cannot be thought to control the human-machine interaction. They can only be thought to be in control as far as they are able to select and drag and drop windows; they are not in control of the chaotic repercussions of these actions. Control of the output of interaction is given over to the machine, which generates an oversupply of largely incoherent and abstracted images, and a chaotic mesh of temporal information. The giving over of control, which is met with a confusion of imaging and temporality, means that the user is no longer able to interact with the environment in a purely cognitive sense. Interaction with *T_Visionarium* moves away from a model of HCI in that it is not centred on what the human wants to achieve. Rather, the model of interaction could perhaps be better described as a process of human-machine events. Viewed this way, interaction is a process of extension, not of control. The human extends over the machine and the machine extends over the human.

7.2 Time and Narrative in *T_Visionarium*

T_Visionarium presents a time that is out of joint. The work fractures television's imaging of the world into multiple durations. As has already been described, the image within each window is an image taken at random from free to air Australian television. These images are quite obviously from different historical periods in time. For instance, images from re-runs of soap operas may be triggered alongside historical documentary footage, along with a near-current news story or a relatively recent Hollywood blockbuster. These images, from different time periods, when presented and recombined within AVIE, allow the viewer to re-experience the actual time of these events as a simultaneity of out-of-joint durations. The participant experiences multi-temporal durations through the multiple clips displayed in the windows of *T_Visionarium.* Also, time seems out of joint as the particular duration of a particular window tends toward rendering the episode incoherent. This is due to the way the segments are edited before being entered into the database. Each clip is edited in terms of individual shots. Any particular clip has its end point when

the original director of the television program from which it is drawn changes shot. The shot may change in mid narrative stream, or may only capture a small movement, which is then deprived of its link with the movement of the next shot. The time of the duration of each shot seems to be flowing toward its extension in the next intended shot. But in AVIE the next shot never comes. The arrangement of the image sequences into discrete shot segments disallows this flow. It is as though the images attempt to flow through their original duration, then suddenly stop and then repeat. The resulting temporal loop makes time seem trapped in the short two to three second duration of each shot. Those things outside of the edit points, the next intended shot of the original that never came, remain as the out-of-field, as virtual images. Only their affect is felt not their actualisation.

The looping shots can be re-combined to structure a fractured and quite incoherent narrative. The user assembles this narrative by dragging and dropping images on top of one another, this then causes the system to play the shots back to back. Each image is abstracted from the flow of duration in that it has been taken out of its original temporal context. The flow of duration has been further abstracted as it has been added to by other disparate durations. In a sense the duration of *T_Visionarium* is constructed as though a patchwork assemblage, with images being taken from their original context and remixed together in a multi-linear narrative. The temporality of one clip's duration is added to by the temporality of another clip's potentially radically disparate duration. Multiple temporal rhythms are thus combined in the one event.

In the multi-temporal event time becomes a patchwork of potential connections. The narrative that is constructed commonly, and unavoidably, makes jumps from time period to time period in what may be viewed as flash-backs or flash-forward, but here flash-backs and flash-forwards that do not have a common point of departure anchored in time. It is as if they are schizophrenically triggered without a reference point in the present. Also narrative time is confused. In some parts narrative time speeds up as the edit points come close together in certain clips. In these instances in which sentences, words, movements and gestures are cut off before they are completed, we feel that we have missed too much of the narrative to make coherence possible. In other clips, narrative

time is slowed down as the clip continually loops. In these instances we are given an excess of time to concentrate on one image, thus searching for narrative meaning and connections that are simply not there. This temporal distortion of traditional narrative duration is similar to that which I signalled in Chapter 3 in relation to Viola's work. Following Hume's sentiments we see the temporal distortions within narrative time creating a sense of dis-ease within the user.[431] This is because the user's need to see and conceptualise all that is meaningful is subverted either by the narrative ellipses or pauses; the former creating a sense of time moving too fast to allow reflection and the latter affording too much time to the contemplation of images.

We see in *T_Visionarium* a chaotic complex of data; in this sense we can, as Weibel points out, citing Jorge Luis Borges short story "On Exactitude in Science", consider *T_Visionarium* as a map of everyday life.[432] This 'map' does not rely on the linear characteristics of classical narrative or the static representations of a spatial schematic in order to describe life, and thus avoids the tendencies of narrative to reduce complexity and spatial thinking to reduce temporality. Weibel's idea of *T_Visionarium* as a map has to do with presenting a complex of data through which the user must navigate their own path. Rather than being presented with the singular grand narrative of television, the user may actualise one minor narrative from a field of the multiple. The multi-temporality of *T_Visionarium* can be thought of as a map of presentness. It is a collection of multi-temporal data, representing the turbulences and chaos of a moment of the present; a moment that becomes *eventful* as it extends over and contains the past and the future. The present carries the past into itself. I have argued this throughout this thesis in terms of Barthes' punctum, Claerbout's work, the temporality of database aesthetics and the enactment of a Deleuzian framework of the virtual and Whitehead's extensive continuum. This is active in *T_Visionarium* as at every moment the present is filled with pastness. The viewing present is inflated with the pastness of the images presented across AVIE's projection surface.

The recombination of the televisual material of *T_Visionarium* allows the material to be experienced in a vastly different fashion from its original location. This is the

deterritorialisation and reterritorialisation of occasions that I spoke of in the previous chapter. The material is no longer experienced in a linear sequence but now as a complex of presentness. In this sense, the work attempts to subvert television's imaging of the world; it provides an alternative and makes obvious that television's imaging of the world is merely one possible mediation of information, not necessarily the true nature of reality. *T_Visionarium,* in its recombination of televisual material, also makes possible a reassessment of the experience of time. This work makes clear that televisual time, just as its information, is merely one possible media generation of time, and opens up the experience of mediated time for possible new re-presentations. The world made strange that *T_Visionarium* presents is not merely made strange by the oversupply of information, or the oversupply and continual production of spaces for the unfolding of this information. Rather the world is made strange within *T_Visionarium* because of the confusion it affords our everyday experiences of time.

7.3 Time (Re)mediated

T_Visionarium not only remediates events but remediates the time of these events and the time of the medium of television. As a result *T_Visionarium* presents us with an alteration to our existing concepts of time. This type of alteration can be seen in other works that mediate real world events through the digital and the database. For example, Fujihata's ongoing *Field Works* projects are a set of works that present an altered sense of time. For some aspects of this project Fujihata designed a camera with a Global Positioning System (GPS) that is able to document the exact location in which it recorded a particular event. This information is then assembled to create a map of one particular district or city, which is presented as a 3D map through which users navigate. The map here is a map of the events that take place within the city. Just as with Weibel's citing of Borges map to describe *T_Visionarium,* the world of *Field Works* is presented as a complex of events. To understand the space, to read the map, is to understand the events of the inhabitants of that space. This largely spatial work, at its core, deals with events and temporality. It is as I put forward in Chapter 5, the space is merely the outcome of the events that take place within it; in the Whiteheadian sense it is the outcome of the flux of events.

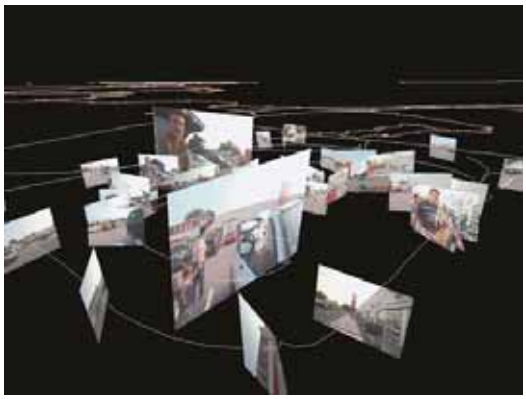

Figure 93.

Figure 94.

Masaki Fujihata, *Field Work@Alsace*, 2002

In *Field Work@Alsace* (2002) (fig. 93-94), one outcome of the project, Fujihata presents images from multiple temporal locations in one interactive space. The user navigates through the space of moving images and experiences the time of each image. Fujihata here presents a new map, an impression of space that takes into account the events that manifest that particular place. This map takes the form of windows streaming the video of interviews with the inhabitants of Alsace, a region on the border between Germany and France, connected by a thin white line that, via GPS data, charts the movements of the cameraman around the region. This is made possible as the GPS records the metadata such as the location of the camera, even when the camera is not recording, when, for instance, the camera (and the cameraman) move from the main camp to the interview location. This enables Fujihata to generate the shape of the space of Alsace based upon the movements of the camera from place to place. It is from this emphasis on eventful occasions – raw data occasions such as the original interviews recorded by the camera, and metadata occasions such as the movement of the cameraman and the location, motion and direction of the camera – that the temporal emerges.

In *Field Work@Alsace* Fujihata presents multiple episodes, from various points in time simultaneously. In the section of presentness represented by the work, the multiple sections of past occur all at once. Fujihata thus maps not just the space of Alsace but also the time, and the eventful occasions that occur through time, which manifest the temporality that is folded into the space of Alsace. Fujihata presents sections of past,

distributed on a map, that represent the experience of and production of space. The event of *Field Work@Alsace* is necessarily temporal as it connects us with the time of the place. Every section of past is open to our exploration of this digital memory in the present, as this collection of audio-visual information is open to search and retrieval.

The archive here is the site of extension. The place that is described by the map of Alsace is produced by the events that occur within that space, which are organised by Fujihata and accessed by the navigation of the participant. Further from this, the space is produced as one moving image extends over others. The space is produced as we see, for instance an interview with a woman on a ferry in the Rhein river, in one moment in time, connected to an interview with a mother and daughter in the car park of a grocery store, in a different section in time. These once disparate temporalities and locations are brought together in the time and the space of the work, which thus generates the possibility for multi-temporal relationships to be formed between the images.

This is the literalisation of Whitehead's nested durations and Serres' turbulence. In terms of Whitehead, we have already seen in the previous chapters that one occasion may extend over others in order to constitute the event. Further to this, we have seen that one occasion extends over other occasions and that one duration may wholly contain another duration. In database works such as *T_Visionarium* and Fujihata's *Field Work@Alsace* the duration of one event, evidenced by the moving image of each window, extends over the duration of the other events. In the interactive instance, the user and the digital work together to generate connections between two occasions. These occasions may have once been temporally distant but are now experienced as contemporary. The single timeline is destroyed in place of multi-temporality; in other words the sequential experience of linear time is supplanted by the simultaneous experience of different temporalities.

In Serres' terms both works make nonlinear and topological time literal. As already mentioned in Chapter 2, for Serres time does not always flow in a line, but rather moves in an extremely complex mixture, as a turbulence of flows and eddies.[433] As discussed in Chapter 2, he explains his concept of time with the example of a handkerchief, rather

than a line. The two points on the handkerchief, when laid flat on the ironing board are far apart, but when the handkerchief is folded in Serres' pocket, the two points are touching. For Serres this is the way time is. Events of the distant past may be felt within present occasions and events that are contemporary may have very little to do with each other. This is the case with the archive as seen in both *T_Visionarium* and *Field Work@Alsace.* In both works, and in general any such work that opens a database to user navigation and recombinatory searches, the possibility exists to generate close relationships between once temporally distant information.

T_Visionarium presents multiple loops of television footage. This amounts to a multiplicity of looping events, in particular the mediated gestures of actors and TV personalities, displayed across AVIE. This makes clear the way in which these mediated gestures can be abstracted from their original temporal context and reconstituted into a database-occasion, as theorised in the previous chapter. In relation to the mediation and appropriation of moving images, Jill Bennett draws a connection between *T_Visionarium* and Candice Breitz's companion installations *Mother* and *Father* (2005) (fig. 95). Bennett indicates that this connection is due to the similarities in the treatment of bodily gestures in each work.[434] As Bennett points out, both works elucidate the concept of gesture being media-specific rather than belonging to its subject. In both works the loops of usually subtle or unnoticed gestures become a central element. Furthering Bennett, the similarities between these works also stems from the mediation of time in both works, even though Breitz's work is not built around an interactive database. In Breitz's *Mother* and *Father,* both six channel video works represent six Hollywood actors performing motherhood and six other Hollywood actors performing fatherhood. These sections of narrative are extracted from the original context of the Hollywood film and played out against a uniform black backdrop.

Figure 95.
Candice Breitz, *Mother*, 2005 and Candice Breitz, *Father,* 2005

In *Mother* and *Father's* re-presentation of time, the work displays information from various sections of past simultaneously. The present moment of viewing the work is constitutive of the carrying forward of the past in the present. We view a chorus of pastness in the present. As we see images of well known actors abstracted from well known films, the virtual images that surround these images, those images that exist in the out-of-field, are also felt. In other words the affect of the moving images' original context is felt along with the affect of its contemporary context. For instance when we see images such as Dustin Hoffman and Meryl Streep from *Kramer vs Kramer* we fill the images with its previous context. But this occurs simultaneously with the experience of the image in its present context, alongside other images of motherhood and fatherhood. Hence, the pastness of the image and the presentness of its viewing are felt in the one viewing event. There are thus multiple levels of affect felt as the past image is transported into a simultaneity with other temporally disparate information. This is similar to *T_Visionarium* in its abstraction of televisual information from the overarching televisual context. In both works a small section of past is abstracted from its original context and reconstituted within a multi-temporal context, felt in the present. Thus, in *Mother* and *Father* as in *T_Visionarium,* the present moment becomes inflated as it becomes filled with various moving images that represent sections of the past and a multiplicity of the virtual counterparts of these images.

7.4 Differentiated Structures that Mesh

New media is marked by meshings and becomings; technology meshes with the user, parts of the technology mesh with other parts of the technology, applications of one type mesh with the output of another type. These are DeLanda's meshworks; the coming together of two heterogeneities in order to constitute new ways of being.[435] All the collisions that occur in the milieu of new media culture have the potential to form new connections, new assemblages, new events, which provide the potential for unforeseen becomings. The patchwork of new media can be seen quite easily on the substrate of *T_Visionarium.* The projection of images visually distributed across AVIE acts as a metaphor of the ecology of media images, and a type of patchwork that is continually repatched and reworked.

In *T_Visionarium* a media ecology is set up between the interface, the projection environment, the database, the dataset of televisual information, the software, the condition of the particular user, and the mechanics of the technology. All these things extend over one another and obtain their character through this extension. In other words, any one actant, be it the software, the images of the interface, the mechanics of the system, the database or the condition of 'userness', functions in the manner it does as a direct result of its relationship to all the other actants. This is also true for the televisual information actualised upon the substrate of AVIE. Each looping television clip obtains its character based on those clips with which it is contemporaneous. This is how the thickening of duration manifests. As an ecology of images and an ecology of media technology comes into being, so does an ecology of the various scales of the temporal embedded in these media images and technologies.

These meshes can also be seen in Amerika's Internet based work such as the already mentioned *FILMTEXT 2.0.* In this work Amerika taps into the Internet as an experimental writing zone, in which language, when meshed with new medias, may adapt as it interrelates with the new technologies of communication. Amerika states that the language of new media may evolve in these works as image-writing, sound-writing and code-writing exist as complimentary processes that feed of one another in order to

constitute interactive narrative.[436] In these works the processes of production, the writing of code, language, image and sound, mesh with one another in order to produce a narrative which may cause a re-evaluation of writing processes in light of the emergence of a network culture. In addition to this the technology meshes with the content of the work in order to produce the felt event of the work. These transactions are all temporal. For instance, in *FILMTEXT 2.0* (fig. 96), as pointed out in Chapter 5, the source material taken from various geographical locations mesh in order to create a differentiated space, a type of Internet space that is made up of the meshwork facilitated by the artist. This also creates a meshwork of temporalities as the time of the user meshes with the time of the Internet. The time developed through the meshworks of *FILMTEXT 2.0* emerges as we navigate the asynchronous and nonlinear time of the Internet and the archive.[437] This navigation amounts to a navigation sideways, following the framework established in Chapter 2, through the time of the Internet and the archive, whilst simultaneously interacting in the time felt in the material present.

Figure 96.
Mark Amerika, *FILMTEXT 2.0* (screenshot), 2002

This work contains text files, audio files and moving images, based on a website, with fixed links between these files. These separate parts of information, or actual occasions, as well as the interface, and the condition of userness, extend over one another to constitute the work. In *FILMTEXT 2.0,* the user navigates sideways, rather uncontrollably, through the narrative information stored on the Internet, whilst

constructing the narrative in a more traditional linear sense upon the interface of the screen. Perhaps this is what Amerika refers to when he asserts that the user is able to experience themselves drifting in the non-space of the Internet.[438] This drifting occurs as the work directs the user sideways through time, through the hierarchical archive of information, whilst actualising a narrative in real time. Following this, the work uses the multi-temporal information of the archive in order to create a narrative experienced in material time; by this process asynchronous information is translated into synchronous occasions.

By the same token, computational processes and coded information, that are not made actual, nevertheless direct the passage of actualities in *T_Visionarium*. Algorithmic information such as the tagging architecture of *T_Visionarium*, though not able to be directly accessed by a user, directs the aesthetic of the work as it structures the relationships that are generated between the television images. The tagging architecture and the processes that are enacted by the system's programming language provide the necessary circumstances for the actualisation of images and narrative relationships. Thus a mesh of digital occasions affects the narrativity of the actual images. When *T_Visionarium* in particular is viewed its aesthetic is driven, at its most basic level, by the interrelationship between the database structure and the material occasions of interaction.

When these two occasions are viewed within time the interrelationships that are formed *in* time are made complex. Media art can only be thought of as the intermingling of the computational processes and the actual information of the aesthetic event. In order to do this we need to move away from the conception of the database as the raw material for creativity with new media and instead view this tool as potentia toward a symbiosis. The database is not itself creative, but rather it is one force amongst others that directs the aesthetics of interactive media art. If we are to position the database in this way we must view the architecture as a necessarily temporal entity, implicated in the events of interaction. As has been pointed out, the database is often characterised as spatial rather than temporal. But if the fluid intermingling of database, that which is made actual via

the interface and the physical events of interactivity are brought to mind, we cannot substantiate a purely spatial reading of the nonlinear database structure.

The database exists as a nonlinear structure that is programmed to organise information in a particular way. In contrast, the occasions of interaction form a progressive series of events. These two structures form a concrescence or a nexus; they are inextricably connected such that neither can be meaningfully brought to mind without the other. The digital system senses the series of occasions initiated by various users over time and uses this information to initiate other digital activities, such as the triggering of images, in the case of *T_Visionarium*. In turn a user negotiates with digital processes as they work with the particular digital system, initiating certain actions in response to computer generated processes. Whitehead, using a cup and saucer elucidates this process that I see occurring between the digital system and the physical events of interaction. Whitehead states, "…it is as though the cup and saucer were at one instant identical and then, later on, resumed their distinct existence."[439] If we think of the digital and the material as Whitehead thinks of the cup and the saucer the multi-temporality of *T_Visionarium* is highlighted. It is though the digital occasions and the physical occasions of interaction were at one instant identical, as they enter into the common operation of interaction, and then, later on, resumed their distinct existence. There is a digital-material event at one instant, just as there was a cup-saucer event for Whitehead.

In addition to *T_Visionarium* this can also be seen for instance, in Cmielewski and Starrs' already discussed work *Seeker* (fig. 97-98). In this work, as already mentioned, the user enters her family's migration history via a touch screen. A second screen at once shows satellite imagery of various cities and also presents information of the large number of deaths that have resulted from attempting to seek refuge in another country. A third screen plots migration patterns upon a map of the world. Neither the database that organises this information, nor the images upon the screen can be meaningfully brought to mind, in the context of the work, without the other. Thus, there is a constant flow of meaningful interactions between that which is made actual via interaction and the

information which is organised within the database. Both the actual images and the database structure constitute the new media artefact as a process of fluid interminglings.

Figure 97.

Figure 98.

Leon Cmielewski and Josephine Starrs, *Seeker* (installation details), 2006

What is interesting for the purposes of this chapter is the way in which data occasions and interactive occasions can be understood to present multiple scales of the temporal through their concrescence. Both these occasions are similar but are organised in different ways. The interactive occasions are organised in a process which, after Whitehead, sees one occasion following the other, similar to building blocks, while the database houses its occasions in a nonlinear structure. Although these occasions differ they prehend one another in the sense that they are contemporary occasions that go together to constitute the interactive event; the physical interactive occasions draw upon the contemporary occasions of the database, the two structures mesh. In this way the time of the database meshes with the lived time of the physical events of interaction.

In this work at any one moment there is a multiplicity of occasions, each one extending over all the other present images and simultaneously extending over the just-past occasions and the just-future occasions. The event is a complex of the present which is inflated by the temporal information looping on AVIE's substrate, and the extension of these clips into the past and future.

T_Visionarium visually represents a topological transformation as windows cluster and re-cluster in unforeseen formations; this restructuring is similar to Deleuze's conception of the simultaneity of points of present that break with external succession in order to

present the direct time-image.[440] Deleuze argues that the direct image of time is marked by various chronosigns. The first of these that he describes concerns the order of time and may act as a means to elucidate the multi-temporality of *T_Visionarium*. This chronosign presents the internal relations of time. Thus, as Deleuze points out, it is not concerned with the sequential ordering of time.[441] This type of chronosign is rather constituted by the coexistence of plural episodes of time and the realisation of their temporal relations. The chronosign that marks the order of time is seen in *T_Visionarium*; it exists as either the coexistence of all the sheets of past or the simultaneity of peaks of present.[442] That is, in this particular regime, all episodes of the past, either as virtual sheets of past or recollections of peaks of present, are contemporaneous with one another. This contemporaneity allows a break to be made with linear succession, which in turn allows cinematic narrativity to make temporal jumps from one image to another. In *T_Visionarium* these jumps become more complex than those made by the cinema that Deleuze is concerned with. *T_Visionarium* presents selections of the peaks of present upon AVIE's projection surface, in the form of the images taken from Australian television. The viewer then performs the quantic jumps between images. These quantic jumps connote the viewer's navigation through the nonlinear time of the database.

Describing navigation through a database as quantic emphasises the movement from one particular time to another. As the work unfolds multiple sections of time the user is able to move from the temporality of one moving image to the differentiated temporality of another image. In *T_Visionarium,* as the presentness of interaction becomes inflated by the pastness of the televisual images that are re-presented across AVIE, as past and present combine, Deleuze's time-image crystallises. The present is thus thick with multi-temporal information of pastness. In a work such as *T_Visionarium*, in which a user jumps from moving image to moving image they also jump from temporality to temporality, with interaction taking place in a field of multi-temporality.

CONCLUSION

People assume that time is a strict progression of cause to effect. But actually, from a nonlinear, non-subjective viewpoint, it's more like a big ball of wibbly-wobbly, timey-wimey stuff.

Doctor Who, in the episode *Blink*

I have argued throughout this thesis that the aesthetic event in interactive digital art cannot be substantiated as an inert artefact, or thought of as a continuity of compartmentalised occasions. Rather the interactive aesthetics of digital art must be understood through the concepts of the event, which is framed by Whitehead's concepts of process and Deleuze's concepts of the virtual. As already mentioned, the event for both Whitehead and Deleuze exists as a turbulent occasion that both extends into a future beyond itself and a past of which it is beyond. In essence the turbulent and complex event is a process of hybridisation.[443] The concept of the event when put in relation to the digital encounter, privileges *processes* rather than *things,* which are the outcome of these processes. It is not the aesthetic artifact that we are interested in but rather the process of the digital encounter, in which all actants exist within a constant state of change. In terms of digital aesthetics, our thinking needs to shift from privileging an aesthetic artifact or atechnical architecture to privileging techno-aesthetic processes, a shift that is only possible when we think outside the metaphors of space by beginning to grapple with questions of time.

As Whitehead states, each happening is a factor in every other happening.[444] And this is true for the works I have discussed in this thesis. Every event, whether this be a software-event, an interface-event, or a user-event, is a factor in every other event. The software-event extends over the interface-event which extends over the user-event. The multiple goings-on within the complex regime of the digital combine to give the individual character to each instant of the digital encounter.

The way in which we experience time is altered by our interactions with digital systems. As we encounter new modes of communication and information management systems, such as vast networks and databases, our modes of thought and our modes of practice undergo significant change. As Jean Francois Lyotard pointed out in 1979, the new modes of interaction that may be brought about by the ubiquity of technology bring with them new modes of thought.[445] Transplanting Lyotard's thought to the contemporary condition of technology, we see that the new modes of practice that are now ubiquitous in the post-digital age necessitate that we operate within a temporal regime that is radically different from the classical linear sequential model of time. This is because our experience of the aesthetic, interactive digital encounter prompts us to both think and feel in specific multi-temporal passages. As Whitehead points out our conscious experience of time is a product of our consciousness' being in time. As I have explained throughout this thesis, for Whitehead our consciousness is brought into being by the events that occur in reality. Therefore I have focussed on the processes of these events, rather than on an investigation of consciousness. Temporal events prompt our consciousness into being, not the other way around. Thus temporal events prompt us to experience time a certain way.

When we think of interaction with the digital as the extension of events, the participant cannot be thought of as a self-bounded and timeless subject. Rather, the participant, through the framework worked up in this thesis, is thought of as a site of multiple interconnections and interrelations. The participant in interactive digital art is not a discrete entity, and hence cannot be described without reference to the goings on in multiple other regions of space and time.[446] This framework led me to move my analysis of the digital encounter away from conceptions of a single individualised user and instead toward a concept that I termed the condition of 'userness'. In this concept the user is not thought of as a singular subject; rather the condition of 'userness' focuses on the user initiated processes that are sensed in the digital encounter. Following Whitehead's metaphysics, we need to theorise the condition of 'userness' as the condition of permanence *and* flux. It is not that the 'subject' exists as a permanent enduring object,

rather they are in a constant state of flux, or becoming, that at its core taps into eternal, virtual relationships and potentialities as a series of occasions that constitute interaction.

If the participant is to be substantialised, she can only be thought of as the outcome of an event, connected to all the other entities that constitute the assemblage of the event. The participant, when understood in this manner, is positioned as inextricably connected to the environment of the work, and also to the temporal experience of that particular environment. The participant is to be thought of as an interacting entity that is subjected to other processes in the digital encounter.

This, for instance, can be seen in works such as Shaw's *ConFIGURING the Cave,* mentioned in Chapter 5, or Amerika's *FILMTEXT 2.0*, mentioned in Chapters 5 and 7. In both these works the event of interaction marks the actualisation of the work. The aesthetic event only occurs as the occasions of the digital extend over the materiality of the user. For example in Shaw's work the aesthetic event only occurs as the user physically moves the mannequin in the centre of the room. This then triggers the digitally generated images on the wall of the CAVE. The entirety of the work does not involve just the digitally projected image but is rather manifest by the relationships formed between the environment, the user and the digital, all these events extending over one another. The user of *ConFIGURING the Cave* is not separate from the artwork; rather they are an inherent part of it and its enactment of a certain mode of generating a temporal aesthetic. In this thesis I have not been interested in investigating the way in which the user's movements of the mannequin, for instance, may reflect the particular user and her psychology. Rather I have been interested in the way that these activities represent one occasion of 'userness' that goes to make up the larger condition of 'userness'. This is a condition that does not just take into account one particular user but rather attempts to view the multiple user-initiated actions and the multiple users that may come into contact with the work as constitutive of a larger condition. This is more inline with Whitehead's process philosophy which would view interaction as a series of actual occasions that extend over one another. Thus, I have viewed the multiple users that may interact with

the digital as a string of actual occasions that have come into contact with the occasions of the digital.

Similarly in *FILMTEXT 2.0,* the artwork exists *for* an individual and *with* an individual. Without the interaction of a user, without the process of events, *FILMTEXT 2.0* remains unrealised, as a collection of data on the Internet. The user must connect with the work to bring it into existence at any particular moment in time. As the condition of 'userness' changes, the condition of the work changes. In *ConFIGURING the Cave* the user can be thought of as immersed in, and inextricable to, the space of the work, likewise in *FILMTEXT 2.0* the user may be understood as immersed in the flows of networked information.[447] As such, both works represent the articulation of two conditions. Both works enact a process in which the condition of 'userness' comes into contact with the condition of the digital.

Following Whitehead, processes occur independently of any other ontology; space and time are derived from process, it is not that processes are contained by, and thus conditioned by, the substratum of space-time.[448] This denies a single time that permeates the universe; as has been argued previously there is no underlying continuum on which everything is built, no pre-existing substratum. Actual occasions are not in time, time is in them.[449] This theory has been built upon in order to propose a digital temporality which transpires in its distinct duration, as apart from anthropocentric duration. Here time is *produced* by digital events.

In the first chapter of this thesis I surveyed particular elements of the field of literature on interactive aesthetics, paying particular attention to those theorists who situate media art with a spatial framework, and the subsequent neglect of the temporal. I have added to this conversation by providing a means to rectify the neglect of questions of the temporal by investigating the type of time that may be both produced and experienced in the digital encounter. I have argued that the multi-temporal information housed within the archiving structure of the database, and the nonlinearity of digital systems in general, enables a

thickening of duration and a differentiation to the traditional concept of a sequential linear time.

The nonlinearity of time has been conceptualised within the two major philosophical groundings to this research. In particular, in Chapter 4 I situated the temporal aesthetics of interactive media art within the theoretical framework of Deleuze's philosophy of the virtual. This enabled me to investigate interaction as a common operation between the non-living technology and the living user, both providing their own conditioning to the encounter and combining to set the larger condition for digital aesthetics. Deleuze's philosophy of the virtual was allowed to cross pollinate with Whitehead's process philosophy – an endeavour which I began in Chapter 2 – in such a way that positioned the user and the machine as attaining their particular character as a result of the process of events. These transactions in time, involving the mutual experience of every actant of the digital encounter, are multi-temporal in character as they articulate our every day experiences of time to the complex time of the digital.

This convergence of the time of the human with the time of the digital was the subject of Chapter 5. In this chapter I outlined the way in which the space produced by interactive digital art can only be thought in relation to questions of temporality and process. It is not that the digital realm exists as an 'already-there' embedding space, through which we navigate the network. Rather, the space of the digital is produced through the processes of interaction.

As Murphie points out, our contemporary condition emerges from the ecology of technology and practices in which we find ourselves. Murphie states "life now produces, and is produced in, an ongoing and prolific series of relations between the technics of perception and mediation, animated and mutated matter, and our own 'nervous elements' which we often regard as closest to our sense of self."[450] For Murphie, following Whitehead, life emerges from the incorporeal processes put into action as a complex of actual occasions interrelate and respond to one another. As we enter the digital encounter our condition is constituted by the many occasions of interaction that all extend over one

another. These include our technics of perception, the machine's technics of mediation, the machine's functionality and our bodily movement sensed in the encounter. We are thus transduced by the digital as we are both restricted and enabled by the supplement of the digital to our physical condition. As we form a nexus with digital systems we enter into a complex relationship. The system directs us to operate in specific ways while at the same time we direct the system to enact certain processes.

Following Murphie's sentiments, and building on Fuller's notion of media ecology, the complex processes of the digital encounter are temporal and must be considered as such.[451] These complex processes when thought through a temporal paradigm, represent a condition of a chaotic and turbulent presentness. This concept of presentness, developed by Serres and explained in Chapter 2, reveals the time of the digital as multi-temporal. In the complex of events that constitute interaction there are multiple scales of the temporal all extending over one another. The digital thus represents not just a convergence of space, but also a convergence of times. Traditionally the user of interactive media is thought to initiate a convergence of spaces, as they exist both in the space in front of a screen, and the digital space, somewhere in 'cyberspace' or in Oldenburg's 'third space'. But, as has been put forward here, the user also initiates a convergence of times. The user interacts across differentiated temporalities, and inhabits various temporal regimes. Through our interaction with the digital, as, for instance, we navigate sideways through the thickened time of the database we unfold events from the field of multi-temporality. The time of the user comes into contact with the time of the database, the time of the machine, the time of the network, and the time of other users. Duration becomes thick in the digital encounter as these differentiated temporal occasions extend over one another. Here the lived time of each user comes into contact with the relational and hierarchical time of the digital. The time of the database, housing multiple durations in a hierarchical or relational structure, transposes this complex of differential durations into a simultaneity of once disparate temporalities.

Bergson tells us that we are an image among other images. Whitehead tells us that we are a society of actual entities involved in the passage of nature and thus linked to all other

entities involved in this passage. And for Deleuze, we are a body or a brain placed at the centre of indetermination between the actual and the virtual. For all these thinkers we exist amongst a process of events, and it is these events that give us our individual character. Taking this approach to viewing interactive digital art I have been able to elucidate the meaningful and generative connections formed in the event of interaction. These connections are formed between the user, the machine, the software and all those contemporaneous actual entities. The event of interactive art can thus be thought of as an ecological event. Importantly, this is an ecology of various occasions, each reflecting different temporal rhythms, and combining to produce multiple modes of temporality. The time of the interactive event is a time that is thick with multiple temporalities.

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ENDNOTES

INTRODUCTION

[1] I use the term *experience* here not to signify human experience, or the experience of a user, but rather, after Whitehead's use of the word, to signify the experience of every entity involved in the interaction.
[2] L. F. Werth, "Clarifying Concrescence in Whitehead's Process," in *Time and Process: Interdisciplinary Issues*, ed. J. T. Fraser and Lewis Rowell (Connecticut: International Universities Press, 1993), 229.
[3] Steven Shaviro, *Without Criteria: Whitehead, Deleuze, Kant and Aesthetics.* (Cambridge: MIT Press, 2009), 26
[4] Fredric Jameson, "Postmodernism and Consumer Society," in *The Anti-Aesthetic: Essays on Postmodern Culture*, ed. Hal Foster (Washington: Bay Press, 1983).
[5] Henri Bergson, *Duration and Simultaneity: With Reference to Einstein's Theory* (Indianapolis: The Bobbs-Merrill Company, 1965). And Alfred North Whitehead, *Process and Reality: An Essay in Cosmology* (New York: The Free Press, 1978).
[6] Henri Bergson, *Matter and Memory* (London: George, Allen and Unwin, 1950), 4.
[7] Adrian Mackenzie, *Transductions: Bodies and Machines at Speed* (London and New York: Continuum, 2002), 89
[8] Michel Serres, *Conversations on Science, Culture and Time*, trans. Roxanne Lapidus (Michigan: University of Michigan Press, 1995), 58.
[9] Ibid., 59-60.
[10] Grahame Weinbren, *Frames* ([cited 30th September 2009]); available from http://www.grahameweinbren.net/frames/FramesICCProp/FramesProp.html
[11] Ibid.
[12] Graham Weinbren, "Ocean, Database, Recut" in *Database Aesthetics: Art in the Age of Information Overflow,* ed. Viktorija Vesna Bulajić, Victoria Vesna (Minneapolis: University of Minnesota Press, 2007). 79
[13] Gilles Deleuze, *Cinema 2: The Time Image*, trans. Hugh Tomlinson and Robert Galeta (London: Continuum, 1985). 95.
[14] John T. Caldwell, "Second Shift Media Aesthetics" in *New Media: Theories and Practices of Digitextuality*, ed. Anne Everett and John T. Caldwell (New York: Routledge, 2003).
[15] Jay David Bolter and Richard Grusin, *Remediation: Understanding New Media* (Cambridge, Massachusetts: The MIT Press, 1999), 19; 65
[16] Rob Cover, "DVD Time: Temporality, Audience Engagement and the New TV Culture of Digital Video," *Media International Australia* 117 (2005): 137-148
[17] David Harvey, *The Condition of Postmodernity: An Enquiry into the Origins of Cultural Change* (Cambridge: Blackwell, 1990), 241. And Jean Baudrillard, *Radical Thought* (European Graduate School, 1994 [cited 3rd July 2008]); available from http://www.egs.edu/faculty/baudrillard/baudrillard-radical-thought.html.
[18] Oliver Grau, "The Image: From Real to Virtual" *Switch Shaft,* 18 (2003).
[19] Lev Manovich, "Database as Symbolic Form" *Convergence* 5 no. 2 (1999): 80-99
[20] Henri Bergson, *Introduction to Metaphysics* (New York: Philosophical Library, 1961), 60
[21] Andreas Broeckmann, "Image, Process, Performance, Machine: Aspects of an Aesthetic of the Machine," in *Media Art Histories*, ed. Oliver Grau (Cambridge: MIT Press, 2006), 197.
[22] Steven Shaviro, *Without Criteria: Kant, Whitehead, Deleuze and Aesthetics* (Cambridge: MIT Press, 2009), 17.
[23] Prior to this Whitehead turns up infrequently and is marginalised in relation to Deleuze's more focused commentary on other thinkers such as Bergson, Leibniz or Spinoza.
[24] Samuel Weber, *The Greatest Thing of All: The Virtual Reality of Theatre* ([cited 4th July 2008]); available from http://www.hydra.umn.edu/weber/art2.html.
[25] Oliver Grau, *Virtual Art: From Illusion to Immersion* (Cambridge, Massachussetts: MIT Press, 2003), 169.
[26] Gilles Deleuze, *Difference and Repetition* (New York: Columbia University Press, 1994), 208
[27] Manuel DeLanda, *Intensive Science and Virtual Philosophy* (London: Continuum, 2002), 33

[28] Shaviro, *Without Criteria: Kant, Whitehead, Deleuze and Aesthetics,* 34
[29] Ibid.
[30] Neil Brown et al., "Interactive Narrative as Multitemporal Agency," in *Future Cinema*, ed. Jeffrey Shaw and Peter Weibel (Cambridge: The MIT Press, 2003).
[31] Edwin Gordon, *Rhythm: Contrasting the Implications of Audiation and Notation* (Chicago: GIA Publications, 2000), 125.
[32] *Canada Centre for Remote Sensing* ([cited 8th August 2008]); available from http://cct.rncan.gc.ca/resource/tour/26/26scene2_e.php.
[33] Henri Bergson, *Introduction to Metaphysics* (New York: Philosophical Library, 1961), 11
[34] Whitehead, *Process and Reality: An Essay in Cosmology*, xii.
[35] Whitehead, *The Concept of Nature*, 54.
[36] The links between Deleuze's and Whitehead's thought are beginning to be investigated more rigorously.[36] For instance In 2007 the Whitehead Research Project's *Event and Decision* conference provided an opportunity to explore these theoretical connections. In particular, this conference sought to uncover Whitehead's thought enfolded in Deleuze's and Badiou's. For instance, Jeffrey Bell's paper uses Whitehead and Deleuze, as well as Badiou, to associate Deleuze's concepts of the virtual, singularities and multiplicities, with Whitehead's concept of the event (see Jeffrey Bell, "Fear of Politics: Deleuze, Whitehead and the Truth of Badiou," in *Event and Decision: Ontology and Politics in Badiou, Deleuze and Whitehead* (Claremont Graduate University: 2007). Catherine Keller's paper, similarly to Bell's, articulates Deleuze's concept of the event to Whitehead, in this instance through a theological framework (see Catherine Keller, "Complicities: Folding the Event in Whitehead and Deleuze," in *Event and Decision: Ontology and Politics in Badiou, Deleuze and Whitehead* (Claremont Graduate University: 2007). Keller uses the theology embedded in Whitehead's concepts, and used by several theologians prior, to re-read the theology that may be implicit in Deleuze. Stengers has written on the Whitehead/Deleuze connection, indicating the ways in which valuable concepts can emerge from placing the two thinkers in relation to one another (see Stengers, Entre Deleuze Et Whitehead). In addition James Williams has also written on the connection, firstly tracing the possible crossovers in the thinkers' separate philosophical approaches and also using the two thinkers' individual concepts in concert to produce a novel paradigm through which to analyse literary texts as well as political and social phenomena. (See for instance James Williams, "How to Be Bicameral: Reading William Connolly's Pluralism with Whitehead and Deleuze," *British Journal of Politics and International Relations* 10 (2008)., James Williams, "Deleuze and Whitehead: The Concept of Reciprocal Determination," in *Deleuze, Whitehead and the Transformation of Metaphysics*, ed. A. Cloots and K. Robinson (Brussels: Konklijke Vlaamse Academie Van Belgie Voor Wetenschaapen En Kusten, 2005). As well as this the media theorist Steven Shaviro has written on the Whitehead/Deleuze connection, tracing the ways that their thought may elucidate the contemporary condition and also be used to rethink questions of aesthetics (Steven Shaviro, *Deleuze's Encounter with Whitehead* (2007 [cited 15th July 2008]); available from http://www.shaviro.com/Othertexts/DeleuzeWhitehead.pdf.
Shaviro, *Without Criteria: Kant, Whitehead, Deleuze and Aesthetics.*). In this thesis I seek to allow the concepts invented by both Whitehead and Deleuze to enter into a relationship, to allow the thinker's concepts to add to each other in such a way that enables me to describe the processes embedded in the digital encounter, and further, to propose a model of time in which multiple scales of duration exist simultaneously.
[37]James Williams, *Deleuze, Whitehead, Stengers: The Fold, the Leibniz Lectures and the Free and Wild Creation of Concepts* ([cited 1st July 2008]); available from http://www.dundee.ac.uk/philosophy/staff/williams/Deleuze_Whitehead_Stengers.pdf.
[38] Deleuze's link to Whitehead can be firstly seen in his association with his teacher and colleague Jean Wahl, an early French reader of Whitehead.[38] In addition, these connections extend through Deleuze to those philosophers that worked alongside him, such as Isabelle Stengers, who has provided valuable Deleuzian thought on Whiteheadian concepts (See for instance Isabelle Stengers, "Entre Deleuze Et Whitehead," in *Gilles Deleuze: Une Vie Philosophique*, ed. Eric Alliez (Paris: Les empecheurs de penser en rond, 1998). And Ilya Prigogine and Isabelle Stengers, *La Nouvelle Alliance,* Paris: Gallimard, 1979)
[39] Orit Halpern, "Dreams for Our Perceptual Present: Temporality, Storage, and Interactivity in Cybernetics," *Configurations* 13, no. 2 (2005): 284.
[40] Ibid.

[41] Matt Kirschenbaum, "Introducing Nora: Poetry, Pattern Recognition, and Provocation." International Word & Image Association, Philadelphia, September 27, 2005.
[42] Shaviro, *Without Criteria: Kant, Whitehead, Deleuze and Aesthetics*, 12.
[43] David Ray Griffin, *Whitehead's Radically Different Postmodern Philosophy: An Argument for Its Contemporary Relevance* (New York: State University of New York, 2007), 69.
[44] Pamela Lee, *Chronophobia* (Cambridge: MIT Press, 2004), 52.
[45] Michael Fried, "Art and Objecthood," *Artforum* 5 (1967).
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[48] Alfred North Whitehead, *Adventure of Ideas* (New York: The Free Press, 1967), 179.
[49] Renée Van de Vall, "Immersion and Distance in Virtual Spaces," *Thamyris/Intersecting* 9 (2002).

CHAPTER 1

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[51] Marshal McLuhan, "The Guttenberg Galaxy," in *Essential McLuhan*, ed. Eric McLuhan and Frank Zingrove (London: Routledge, 1995), 126.
[52] Sherry Turkle, *Life on the Screen: Identity in the Age of the Internet* (New York: Simon and Schuster, 1997), 9.
[53] Richard Lanham, *The Economics of Attention* (Chicago: University of Chicago Press, 2006), 75.
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[56] Claire Colebrook, "The Sense of Space: On the Specificity of Affect in Deleuze and Guattari," *Postmodern Culture* 15, no. 1 (2004).
[57] Lefebvre, *La Production De L'espace*, 115.
[58] Rob Shields, "Spatial Stress and Resistance: Social Meanings of Spatialisation," in *Space and Social Theory: Interpreting Modernity and Postmodernity*, ed. George Benko and Ulf Strohmayer, *The Royal Geographical Society with the Institute of British Geographers Special Publication Series* (Oxford: Blackwell Publishers, 1997), 189.
[59] Charles Soukup, "Computer-Mediated Communication as a Virtual Third Place: Building Oldenburg's Great Good Places on the World Wide Web," *New Media and Society* 8, no. 3 (2006): 432, Turkle, *Life on the Screen: Identity in the Age of the Internet*. And Lori Kendall, *Hanging out in the Virtual Pub* (Berkley: University of California Press, 2002), 233.
[60] Ray Oldenburg, *Celebrating the Third Place: Inspiring Stories About The "Great Good Places" At the Heart of Our Communities* (New York: Marlowe and Company, 2001), 2.
[61] Martin Rieser, "The Poetics of Interactivity: The Uncertainty Principle," in *New Screen Media: Cinema/Art/Narrative*, ed. Martin Rieser and Andrea Zapp (London: The British Film Institute, 2002), 157.
[62] George Legrady, "Intersecting the Virtual and the Real: Space in Interactive Media Installations," in *New Screen Media: Cinema/Art/Narrative*, ed. Martin Riesner and Andrea Zapp (London: The British Film Institute, 2002), 226.
[63] Nick Couldry and Anna McCarthy, eds., *Mediaspace: Place, Scale and Culture in a Media Age* (London and New York: Routledge, 2004), 1.
[64] Shaun Moores, "The Doubling of Space," in *Mediaspace: Place, Scale and Culture in a Media Age*, ed. Nick Couldry and Anna McCarthy, *Comedia* (London and New York: Routledge, 2004), 21.
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[68] Phil Graham, "Space and Cyberspace: On the Enclosure of Consciousness," in *Living with Cyberspace*, ed. John Armitage and Joanne Roberts (New York and London: Continuum, 2002), 159.
[69] Saskia Sassen, "Mediating Practices: Women in Cyberspace," in *Living with Cyberspace*, ed. John Armitage and Joanne Roberts (New York and London: Continuum, 2002). And John Armitage and Joanne Roberts, eds., *Living with Cyberspace* (New York and London: Continuum, 2002), 131.
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[76] Grahame Weinbren, "The Digital Revolution Is a Revolution of Random," in *Future Cinema: The Cinematic Imaginary after Film*, ed. Jeffrey Shaw and Peter Weibel (Cambridge: The MIT Press, 2003), 266.
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[81] Ibid.
[82]Ibid.
[83] Legrady, "Intersecting the Virtual and the Real: Space in Interactive Media Installations," 226.
[84] Manovich, *The Language of New Media*, 108.
[85] Legrady, "Intersecting the Virtual and the Real: Space in Interactive Media Installations," 225.
[86] Valie Export, *Expanded Cinema as Expanded Reality* (2003 [cited 17th March 2006]); available from http://www.sensesofcinema.com/contents/03/28/expanded_cinema.html.
[87] Corcoran, "Digital Transformations of Time: The Aesthetics of the Internet," 375
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[92] Ibid., 229.
[93] Ibid., 231.
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CHAPTER 2

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