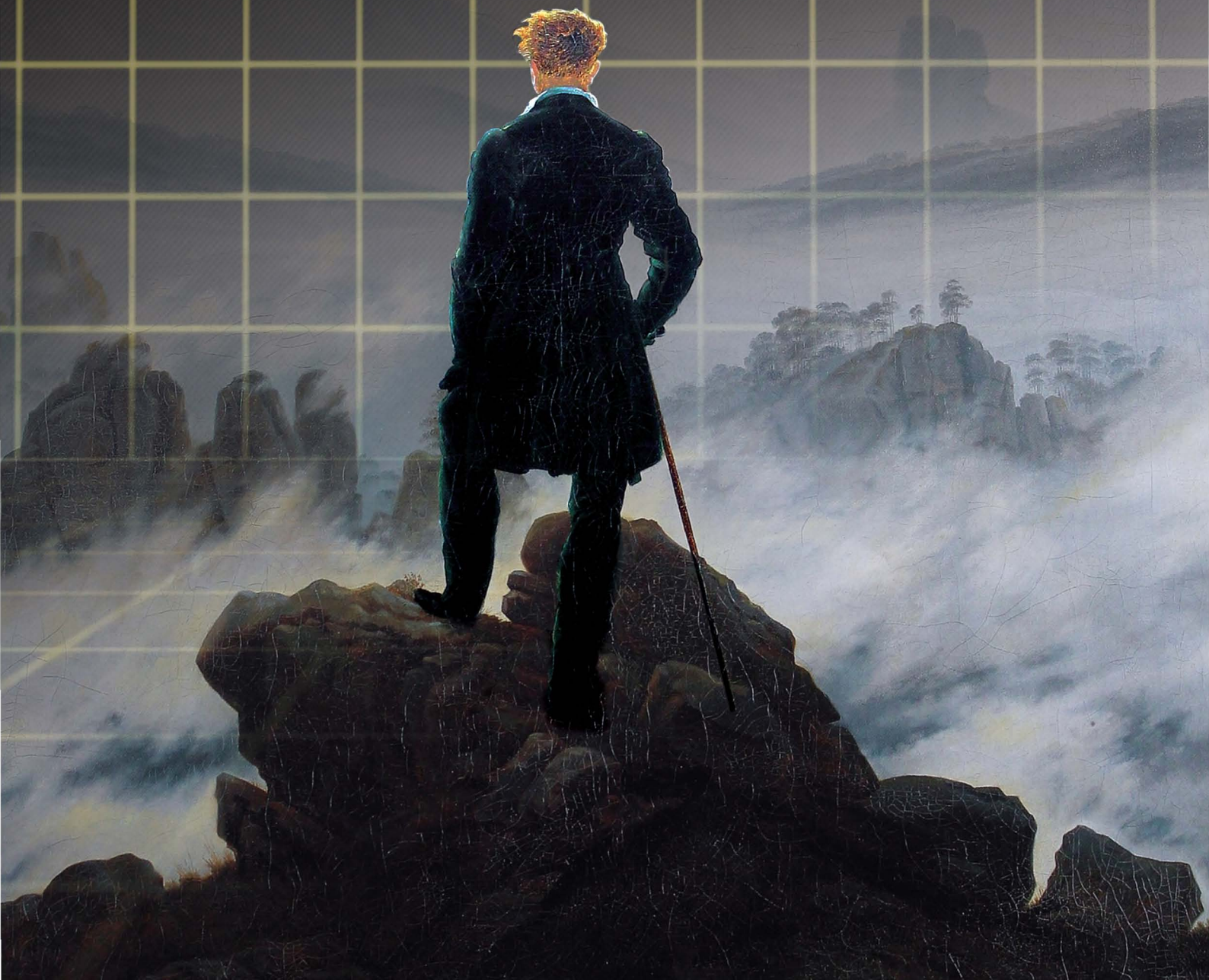


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INTRAMEDIANRY PRESENCE

BODY, INTERACTIVITY AND
NETWORKED DISTRIBUTION IN
IMMERSIVE VIRTUAL REALITY ART



TIM LEIBBRANDT

INTRAMEDINARY PRESENCE
BODY, INTERACTIVITY AND
NETWORKED DISTRIBUTION IN
IMMERSIVE VIRTUAL REALITY ART

Tim Leibbrandt
lbbtim001

A dissertation submitted in full fulfillment of the requirements for the award of the degree of Master
of Arts in Fine Art

Faculty of the Humanities
University of Cape Town

2013

COMPULSORY DECLARATION

This work has not been previously submitted in whole, or in part, for the award of any degree. It is my own work. Each significant contribution to, and quotation in, this dissertation from the work, or works, of other people has been attributed, and has been cited and referenced.

Signature: _____ Date: _____

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Please Note:

A blog containing documentary footage of many of the works discussed in this thesis has been created in order to supplement the thesis document. This can be accessed at:

<http://intramediary-presence.blogspot.com/>

ABSTRACT

This thesis is concerned with the ways in which the medium of immersive virtual reality has been utilised in the art context since the early 1990s, with a view towards the contemporary relevance of the medium. Artworks that have been realised through both Head-Mounted Display (HMD) and CAVE Automatic Virtual Environment (CAVE) systems are discussed. The first chapter uses the 1993 Solomon R. Guggenheim exhibition 'Virtual Reality: An Emerging Medium' as a starting point in order to introduce the defining concepts of immersion and interactivity into the discussion. Thereafter, the second chapter is focussed on the body in relation to immersive virtual reality, examining the idea of virtual disembodiment in detail. This discussion is influenced by William Gibson's dichotomizing of "meatspace" and "cyberspace" in *Neuromancer* (1984). The psychological effects of avatars (the virtual body that surrogates for the physical body in virtual reality) are also looked at. The third chapter extensively discusses the ideas of agency, interactivity and narrative in relation to expanded immersive models of cinema that incorporate active audience participation. Gonzalo Frasca's video game theory concepts of "ludology" and "narratology" are applied, as are ideas of agency from Brenda Laurel's *Computers as Theatre* (1993) and Janet H. Murray's *Hamlet on the Holodeck* (1998). These notions of agency are also juxtaposed with the problem of passivity within conventional 3D cinema. The fourth chapter concerns cyberspace (defined as a middle-space that emerges between networked telecommunication technologies) and its implications for immersive virtual reality. The chapter concludes with a nod towards the growing potential of the Internet to facilitate the distribution of immersive virtual environment artworks. Finally, the conclusion looks at technological developments that have taken place during the two years that this thesis was written in order to suggest ways forward for the medium.

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Tim Leibbrandt

January 2013

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INTRODUCTION

My thesis is concerned with artworks that have been realised in immersive virtual reality. In other words, the artworks that make up the discussion aim to immerse the viewer (who shall be termed an immersant¹) in a computer-generated, interactive virtual environment through the use of technology. Use of the term “immersive” is intended to convey a similar sense of separation and dislocation as that which occurs when one is completely immersed in a body of water. Immersive virtual reality strives to convince the immersant through their senses (primarily visual and auditory) that they are removed from their external real-world location (what will be called physical reality) and are instead present within the location of the virtual environment.

Initial engagement with virtual reality in the art context was concurrent with growing public fascination with this emerging technology in the early 1990s (mainly in the United States and Canada, although institutions like ZKM Center for Art and Media in Karlsruhe, Germany and others further afield have also played a large role in the medium’s development). This public fascination was spurred on by a slew of science fiction media, most notably novels such as William Gibson’s seminal cyberpunk “Sprawl” trilogy (*Neuromancer* (1984), *Count Zero* (1986) and *Mona Lisa Overdrive* (1988)), Bruce Sterling’s *Islands in the Net* (1988) and Neil Stephenson’s *Snow Crash* (1992); films such as Steven Lisberger’s *Tron* (1982), Brett Leonard’s *Lawnmower Man* (1992), Robert Longo’s *Johnny Mnemonic* (1995; based on a short story of the same name by William Gibson), and Larry and Andy Wachowski’s *The Matrix* (1999); and television series such as Bruce Wagner’s *Wild Palms* (1993; based on his earlier comic strip) and William Shatner’s *TekWar* (also manifested in novels, a comic book series, a videogame and a number of TV movies; these were released at various stages between 1989 and 2009 with a variety of collaborators at the helm). This list is by no means exhaustive.

Alongside these fictional representations, there were a number of symposia, panel discussions and conferences discussing virtual reality at the time. These significantly contributed to the impression that contrary to being wishful thinking that was confined only to the realm of science fiction, virtual reality was something that *actually* existed; that it was fully realised and hence merited serious discussion. It was during the 1989 instalment of the annual SIGGRAPH (Special Interest Group on GRAPHics and Interactive Techniques) conference that virtual reality made its “grand debut” in a panel discussion entitled ‘Virtual Environments and Interactivity: Windows to the Future’² (Woolley, 1992: 14). This was accompanied by two public demonstrations of very early versions of the technology by VPL Research Inc. and Autodesk. VPL co-founder³ Jaron Lanier is generally credited with coining the phrase “virtual reality”, and the company was the first to sell virtual reality products such as Head Mounted Displays and DataGloves in the 1980s. His enthusiastic public talks on the topic of virtual reality went a long way towards generating the hype that surrounded it.

Benjamin Woolley explains that while the virtual reality technology on display at SIGGRAPH ’89 was extremely crude, “the technology’s lack of refinement merely served to show that we were witnessing the creation of something new” (1992: 16). Despite this, he suggests that Lanier’s description of the technology as “exactly as

1 A term favoured by immersive virtual reality artist Char Davies, it has been used here as a shortened form of “immersed participant”. This suggests that the viewer is both immersed in the work and an active participant within the virtual environment.

2 See: (Woolley, 1992: 11-38) for a full discussion of the two virtual reality panel discussions at SIGGRAPH ’89 and SIGGRAPH ’90 respectively.

3 Lanier co-founded VPL with Thomas Zimmerman in 1984.

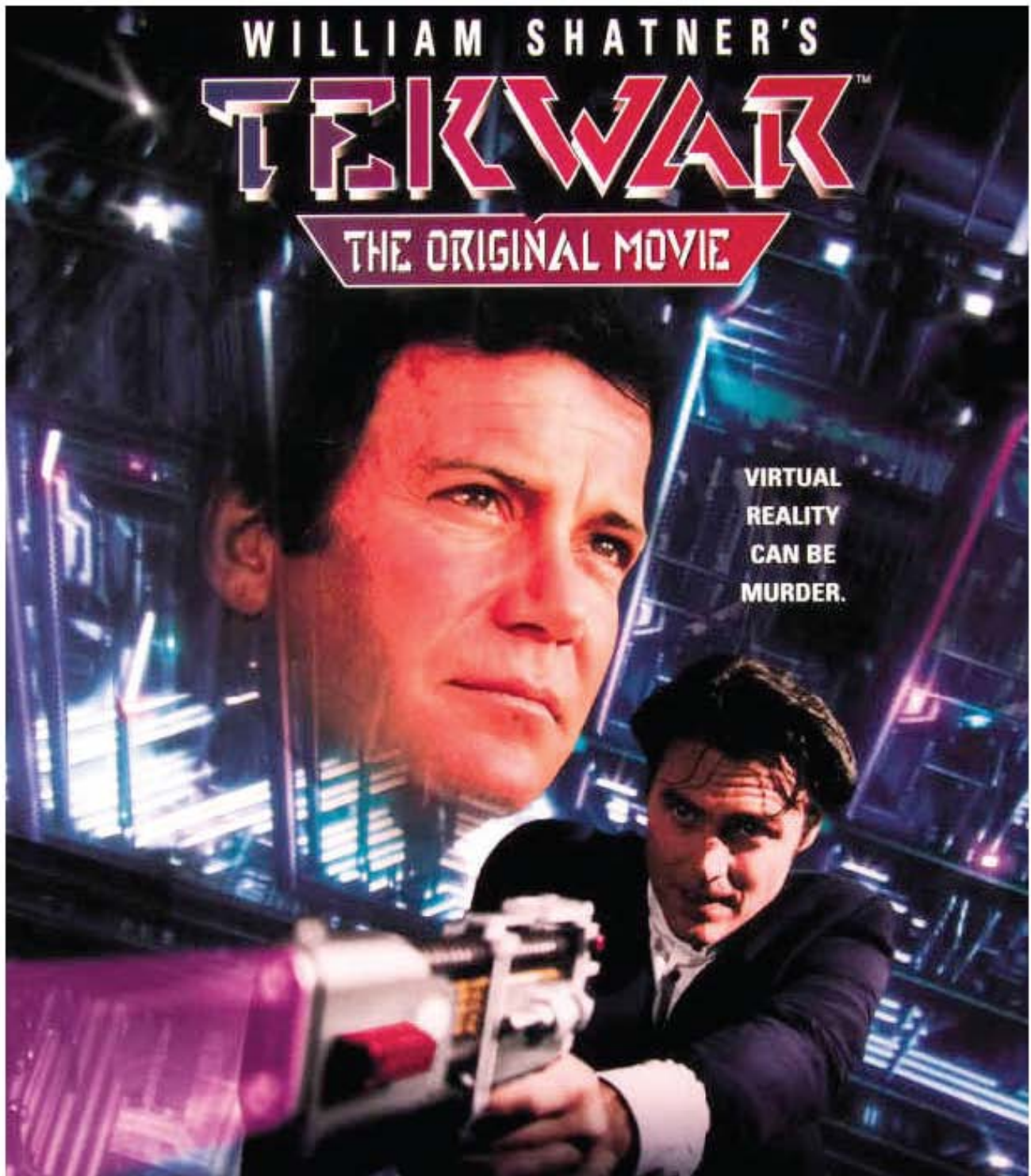


Fig 1. Poster for the first television movie to emerge from William Shatner's *TekWar* franchise (1994).

real” as the physical world but with “an infinity of possibility” failed to reflect this infancy: “Lanier’s rhetoric was not about the future, it was about the present [...] At that first SIGGRAPH meeting, not a single question was raised about the validity of his claims” (Woolley, 1992: 16).

Later conferences such as the First International Conference on Cyberspace (held on 4 and 5 May 1990, at the University of Texas, Austin) assumed a more grounded approach towards discussing virtual reality, acknowledging the embryonic stage of the technology and constructing arguments for where it may be headed. *Cyberspace: First Steps* (1991), the title of the Michael Benedikt-edited book that emerged from the papers presented at the conference, reflects this more deliberated approach.

Around this time, symposia that specifically focused on the relationship between art and virtual reality began to crop up, including the virtual reality symposium at Ars Electronica 1990; the ‘Art After Virtual Reality’ symposium that closed the Solomon R. Guggenheim Museum’s 1993 group exhibition ‘Virtual Reality: An Emerging Medium’; and the ‘Art and Virtual Environments Project’ at the Banff Centre for the Arts in Canada (which incidentally coincided with the Fourth International Conference on Cyberspace in 1994).

Underlying these events were two main concerns, namely the implications of immersive virtual reality on art and the role that artists must play in shaping the development of the technology. As Douglas MacLeod puts it, in 1994 virtual reality was:

unformed and hence its possibilities seem unconstrained. The Arts and Virtual Environments Project [...] was an attempt to insert cultural practice into this realm of possibilities [...] Artists no longer sit on the sidelines eventually to become grateful users of borrowed tools but have become active in development, creating a disturbance in the field with new contingencies (1996: ix).

As it became clear that the level of maturity of immersive virtual reality technology had been overstated, the hype began to subside and public interest in the technology waned. Furthermore, it became increasingly difficult for artists to gain access to the technology due to the “worrisome [...] cultural initiatives [...] suggesting] that all explorations must have commercial or revenue-generating potential” (MacLeod, 1996: xiii). Taking into account the relative inaccessibility of the technology and its very high costs at the time, the prospect of continuing to work in immersive virtual reality became somewhat of a thankless task. Nonetheless, some artists have persisted and it is the intent of this thesis to follow the development of the medium along three thematic lines. The key question that underlies this research is as follows:

With regards to the immersive virtual reality art installations that first emerged in the early 1990s, how have the fundamental concepts of disembodiment, interactivity and networked distribution remained significant as the medium developed, and what is the relevance of these conceptual underpinnings to contemporary fine art practice?

The three main streams of inquiry in this thesis are “disembodiment”, “interactivity” and “networked/distributed virtual reality”. These have been lifted from a definition of William Gibson’s fictional model of cyberspace as disembodied interactive immersion in a globally-networked, computer-generated dataspace. Discussed in the above order, the three streams will form the themes of Chapters Two to Four.

The fundamental inclusion of a model derived from fiction is supported by the fact that in terms of influence over many artists’ ventures into immersive virtual reality, William Gibson’s notion of cyberspace is peerless. The term “cyberspace” was first mentioned in passing in Gibson’s 1982 short story, *Burning Chrome*, in reference to a fictional piece of technology nicknamed the “Cyberspace Seven” (179), but it was solidified as a concept and popularised by his 1984 debut novel, *Neuromancer*. The legacy of *Neuromancer* and Gibson’s notion of

SCIENTIFIC AMERICAN

OCTOBER 1987
\$2.50

The next revolution in computers, the subject of this issue, will see power increase tenfold in 10 years while networks and advanced interfaces transform computing into a universal intellectual utility.



Wired Glove gives a computer user the sensation of handling objects on the screen; the image of the hand mimics the user's movements.

Fig 2. Cover of the October 1987 edition of *Scientific American*, featuring the VPL DataGlove.

cyberspace is vast. Neil Spiller has described *Neuromancer* as a “bible to scientists and science-fiction readers alike” (2002: 102), while Randall Packer and Ken Jordan assert that:

Gibson’s notion of an inhabitable, immersive terrain that exists in the connections between computer networks, a fluid, architectural space that could expand endlessly [...] has opened the door to a new genre of literary and artistic forms, and has shaped our expectations of what is possible in virtual environments (2002: 268).

Throughout this thesis, there will be parallels drawn between key points in the discussion and pertinent aspects of Gibson’s novels. The intent is not to suggest that Gibson’s work was necessarily prophetic so much as to emphasise that it was highly influential, often introducing rudimentary forms of concepts that had not yet been fleshed-out by the surrounding discourse. “*Neuromancer* has so affected the technology debate that one is not always sure what preceded what” (Spiller, 2002: 103). Further evidence of Gibson’s influence on early virtual reality thought lies in the fact that of the fourteen essays in *Cyberspace: First Steps*, seven discuss his work and quote directly from it, while one essay, *Academy Leader* (1991), is in fact written by Gibson himself. That said, this thesis is not a study of Gibson, but an examination of a set of artworks that emerge from a discourse that is heavily influenced by his work.

It is this influence which motivates the limitation of the scope of my thesis to focus primarily on popular fictional media and case studies from the United States and Canada at the expense of a wider, more inclusive sweep. Inevitably, the constraints of length with a Masters thesis result in many relevant examples falling outside of the discussion, but this is an unfortunate consequence of detailed examination of the selected case studies.

There is often a tendency towards fleeting discussions in many of the published accounts of immersive virtual reality artworks. This should not be read as a criticism of those accounts, as books such as Christiane Paul’s *Digital Art* (2003), Frank Popper’s *From Technological to Virtual Art* (2007) and Oliver Grau’s *Virtual Art: From Illusion to Immersion* (2003) are intended as introductory overviews of the medium. These accounts strive to include as many works as possible in one broad sweep instead of looking at specific works in depth. Two notable exceptions to this are the essays in *Immersed in Technology: Art and Virtual Environments* (1996), edited by Mary Anne Moser and Douglas MacLeod, and Laurie McRobert’s *Char Davies’ Immersive Virtual Art and the Essence of Spatiality* (2007). The former details the artworks produced as part of the Banff Centre for the Arts’ ‘Art and Virtual Environments Project’, while the latter is a 290 page book solely dedicated to Char Davies’ work in immersive virtual reality.

My thesis aims to provide a sustained discussion of the selected immersive virtual reality artworks in relation to the theme of each chapter and it should be assumed that works are immersive by merit of their inclusion in the discussion. Consequently, the thesis will omit works that are not immersive. The focus will be on the ways in which these themes (the virtual body, interactivity and networked distribution) are facilitated by the fact that the works are immersive.

The developments in the medium are approached in my thesis as a continuously evolving process rather than as a linearly structured line of descent. Works will not be presented in a strictly chronological order, although the chapters have been ordered according to the date of the most recent work under discussion. This is intended to give a sense of how recently the theme of the chapter has cropped up within art production as the discussion looks towards the contemporary relevance of the medium based on the artworks under discussion.

It is the contention of this thesis that the initial immersive virtual reality project may have been ahead of its time, prematurely attempting to claim and shape a technology that was far too malleable and undefined. The

conclusion will ultimately suggest that in our current position at the end of 2012, artists find themselves in a far better position to realise the immersive virtual reality art project as it was initially conceived, and the underlying concerns of the 1990s remain just as relevant now, if not more so.

CHAPTER ONE

VIRTUAL REALITY: AN EMERGING MEDIUM

By the turn of the millennium a technology known as Virtual Reality will be in widespread use. It will allow you to enter computer generated artificial worlds as unlimited as the imagination itself. Its creators foresee millions of positive uses - while others fear it as a new form of mind control... (Lawnmower Man, 1992)

In the late 1980s and early 1990s, the emerging technology of virtual reality had permeated public cultural imagination in the United States of America and Canada (primarily). Fuelled by a slew of science fiction accounts, this fascination with the emerging technology was largely informed by misinformation and hype. This is encapsulated by the opening moments of Brett Leonard's 1992 science fiction film *Lawnmower Man*, quoted above. Exactly what the term "virtual reality" signified was unclear at the time, but the perception was that the onset of this allegedly burgeoning technology and its transition into "widespread use" would be rapid, inevitable and life-changing.

The general view of what was encompassed by the term seemed to be an amalgamation of "virtual reality" - as in the term coined and popularised by Jaron Lanier and his VPL Research initiative during the second half of the 1980s (*The Economist*, 2010) - and the ideas associated with "cyberpunk" science fiction pioneer William Gibson's concept of "cyberspace"¹. The two terms were often used synonymously and interchangeably at this point; evidenced by D' Amato (1992: 97), Kellogg, Carroll & Richards (1991: 411) and Mitchell (1996: 44) among many others. As Allucquère Rosanne Stone explains it, Gibson's work "triggered a conceptual revolution among the scattered workers who had been doing virtual reality research for years [...enabling them...] to recognize and organize themselves as a community" (Stone, 1991: 99).

If the opening quotation were to be restated in terms of the present relationship between virtual reality and art, then it would read something like this:

By the turn of the millennium an artistic medium known as Virtual Reality will no longer be in relatively widespread use. It allowed viewers to enter computer generated artificial worlds as unlimited as the imagination itself (but as limited as the available technology would practically allow). Its creators foresaw (and continue to foresee) millions of positive uses - while others fear it as a new form of 1990s cultural kitsch...

In other words, by the end of the nineties the production of virtual reality artworks had diminished, as had the hype surrounding the medium as a whole. Jon Ippolito (who had become a notable voice in virtual reality discourse by previously curating 'Virtual Reality: An Emerging Medium', a group exhibition at the Solomon R. Guggenheim museum's SoHo space in 1993) went so far as to suggest that "virtual reality's promise of constructing a ghostly realm that consciousness could explore without the constraints of flesh had become culturally obsolete" (2002: 497). Consequently, it will be one of the goals of this thesis to trace the development of the medium through the 1990s and beyond by looking at the ways in which artists have responded to cultural and technological factors in their continued engagement with the medium, perpetuating the intentions and aspirations of the earlier works.

1 "Gibsonian cyberspace", to use a phrase by David Tomas (1991:32), can be defined as disembodied immersion in a networked computer dataspace. The phrase "disembodied" will be discussed in more detail in Chapter Two, while the idea of "cyberspace" as a networked space will be looked at closely in Chapter Four.

Ippolito's 'Virtual Reality: An Emerging Medium' was exhibited between 23 October – 1 November 1993 at the Solomon R. Guggenheim museum's (then) recently inaugurated SoHo space and was a pivotal moment in American art institutional engagement with this initial virtual reality-based hype. The exhibition was a curious one, and will be the primary topic of discussion in this chapter. There are many reasons for this. Firstly, the exhibition marked "the first of its kind to be offered at an American art museum" (Ippolito, 1993: 1). This is not to suggest that it was the first exhibition ever to deal with virtual reality in the United States; exhibitions such as 'Through the Looking Glass: Artists' First Encounters with Virtual Reality', at the Jack Tilton Gallery in New York preceded it in 1992. Rather, it appeared to point to an endorsement of the medium from the high art institutional authority of the Guggenheim, which seemingly validated the public's curiosity towards it.

Secondly, the exhibition included five fully functional virtual reality installations. Previous exhibitions, such as the Jack Tilton exhibition noted above, largely incorporated proposals, suggestions, and video maquettes. The exhibition catalogue for 'Through the Looking Glass' suggests that the show was "more of a sketchbook or 'projects' show than a definitive statement on the current applications of VR" (Cirincione, 1992a: 9).

Finally, the Guggenheim exhibition proffered a working definition of virtual reality within an art context that will be implemented in my thesis as well. In this definition, virtual reality is distinguishable from other digital art forms such as video or computer art due to immersion and interactivity (Ippolito, 1993: 1). "Immersion" in this context means to convey to the immersant's senses, through the use of hardware, an impression of being located within the virtual "world" of the work. In 'Virtual Reality', this was achieved exclusively through a Head-Mounted Display (HMD) [Fig 3], a headset that was first pioneered by Ivan Sutherland in 1965² [Fig 4] that consists of small stereoscopic displays placed in front of the eyes, earphones for surround sound, and tracking sensors. "When you turn your head, a sensor on the headset adjusts the view of that environment to correspond to your new angle of sight" (Ippolito, 1993: 1). The HMD has the added benefit of providing an image that encompasses the full field of vision of the wearer, assisting with the impression of being in a separate locale to one's physical location.

The term "interactivity" can mean different things depending on the nature of a specific work, but the principal definition is that the immersant is able to affect or engage with the virtual world in some way. At its most basic, this will usually involve being able to freely navigate and explore the work. There may also be objects or entities within the world that the immersant can engage with, act upon, or be acted upon by. The point is that the virtual reality participant is not a passive one. As with immersion, interactivity is facilitated by peripheral hardware, in this case usually a joystick, tracking ball or DataGlove.

Michael Heim dissects this definition of interactivity further, adding "information intensity" as a third category to the "three I's of VR" (Heim, 1998: 7). According to Heim, interactivity is the computer's "lightning ability to change the scene's point-of-view" in accordance with the viewer's movements while information intensity pertains to the "constantly updated information that supports immersion and interactivity", facilitating "special qualities like telepresence and artificial entities" (1998:7). "Telepresence" as used by Heim refers to the immersive sense of being present within the responsive virtual environment as opposed to the other commonly used definition of the remote operation of "robotic mechanisms" (1998:219). For now, interactivity and information intensity will be treated as united under the banner of interactivity.

In contrast, 'Through the Looking Glass' incorporated a definition of virtual reality that "did not accept the

2 See: (Sutherland, 1965:232-236) and (Sutherland, 1968: 757-764).



Fig 3. The HMDs that were used in 'Virtual Reality: An Emerging Medium'.

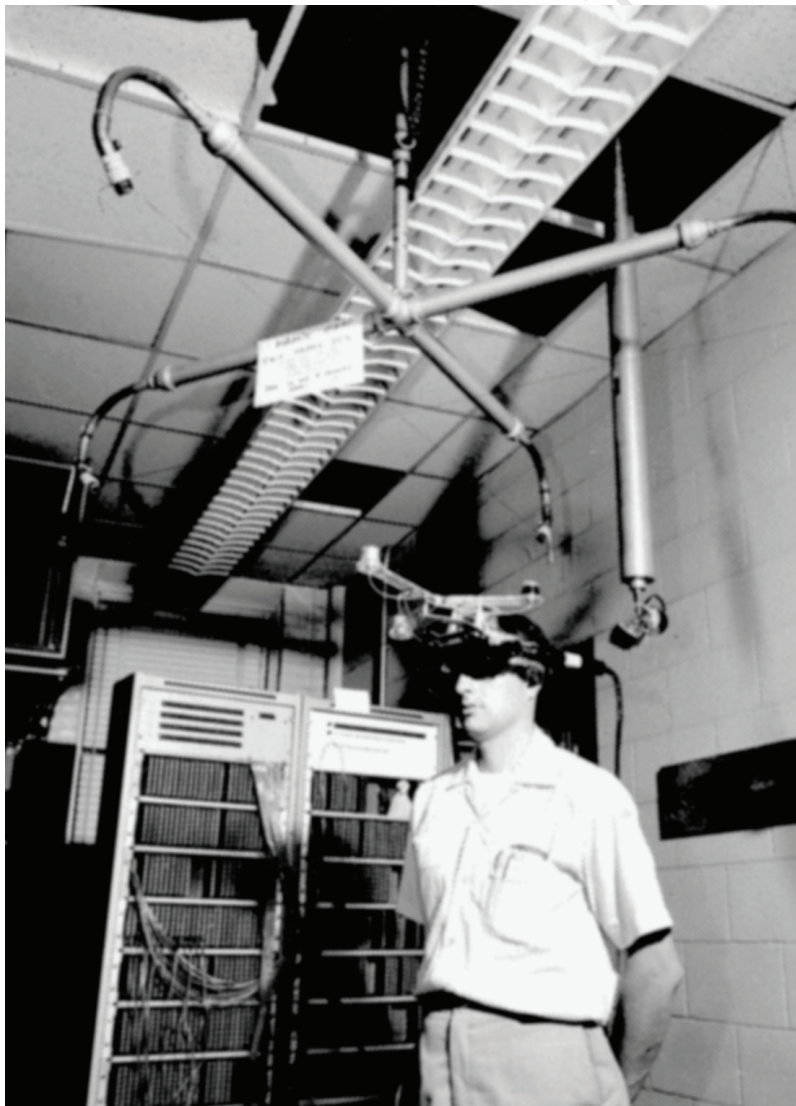


Fig 4. Ivan Sutherland's 1968 Head Mounted Display (HMD) design, nicknamed "the Sword of Damocles".

‘goggles and gloves’ version of virtual reality as the only one possible”, opting instead for a definition broad enough to include automatic teller machines (Hagen, 1992: 19). In acknowledgement of this position, all references to virtual reality in this thesis pertain to the afore-mentioned “goggles and glove”-based immersive virtual reality unless otherwise stated.

‘Virtual Reality’ incorporated only HMD-based works. There was another mode of immersion in existence at the time, the University of Illinois’s CAVE system [Fig 5], which will be discussed in later chapters. CAVE is a recursive acronym for Cave Automatic Virtual Environment, a system that was developed by Thomas DeFanti, Dan Sandin and Carolina Cruz-Neira at the University of Illinois’ Electronic Visualisation Laboratory (1993: 267). Essentially a white cube when deactivated, CAVE achieves its immersive effect through “four rear-projected screens and an active stereo system” (Paul, 2003: 129). Viewers perceive themselves to be located within the projected images through the use of “shutterglasses, light stereoglasses that cause the users to see the images in 3D” (Cruz-Neira et al. quoted in Grau, 2003: 18).

In his acclaimed text, *The Metaphysics of Virtual Reality*, Michael Heim refers to these two virtual reality systems as the William Gibson thread (HMD) and the Holodeck³ [Fig 6] thread (CAVE) of virtual reality discourse (1993: 122), later describing them as “the two main doors of virtual reality today, at least in the strong sense of the term” (1998: 27). A third category of vehicle simulation could perhaps be argued (given its prominence in virtual reality military applications), although within the art context there appears to be little available for discussion beyond the bicycle used to navigate Jeffery Shaw’s sibling works, *The Legible City* (1988-1991) and *The Distributed Legible City* (1998). Accurate simulation of the experience of riding a bicycle is not a focus of either of those works and as such, vehicle simulation will not factor in my discussion.

The lack of CAVE technology in the ‘Virtual Reality’ exhibition could perhaps be attributed to the fact that at the point where works would have been considered for inclusion, the technology was very new and had not yet sufficiently entered the picture. At the time, CAVE had only been publically unveiled at the 1992 instalment of the SIGGRAPH computer graphics convention (Sandin, DeFanti & Cruz-Neira, 1993: 272). A more likely explanation perhaps is that Intel’s Digital Education and Arts program (IDEA) were the main partners with the Guggenheim for the exhibition, and naturally they would want to showcase their own technology. Given that immersion and interactivity were asserted to be the “two advances [which] distinguish virtual reality from other digital art forms such as video or computer art” (Ippolito, 1993: 1), the addition of CAVE into the discussion of the development of the medium at the time is not at odds with the exhibition’s working definition of virtual reality.

It is ironic that ‘Virtual Reality’ was housed at the Guggenheim’s SoHo space. When this was first opened in 1992, the stated intent of the museum was not to “try to keep up with the cutting edge of contemporary art”, but rather to “furnish a historical backdrop for what’s new in contemporary art by exhibiting aspects of the museum’s permanent collection as well as mounting historical exhibitions curated elsewhere” (Johnson, 1992: 112). An exhibition entitled, ‘Virtual Reality: An Emerging Medium’, seems decidedly antithetical to this, particularly in 1993. Nonetheless, it left a lasting impression on the ill-fated⁴ museum, remaining more or less the SoHo space’s only early success story: “The public loved it, filling the museum for its week-long run. This was no small consideration for a branch museum that had counted on attracting 250,000 visitors annually when

3 From Star Trek: The Next Generation.

4 Failing to attract the desired audience numbers, the ground floor of the Guggenheim SoHo’s gallery space was let to retail stores a few short years after its inception. The space was ultimately closed in 2002 and was “widely considered a failed venture for the foundation” (Wolf, 2012).



Fig 5. An example of a CAVE system in operation.



Fig 6. The Holodeck as it appears in *Star Trek: The Next Generation*.

it opened, but [had] averaged only 132,000” (Rosenbaum, 1996).

That legacy was evident when the museum emerged from a four month hibernation between February and June 1996, revealing “an audacious plan to transform the SoHo space into a showcase for cutting-edge multimedia art” (Rosenbaum, 1996), opening with an exhibition entitled ‘Mediascapes’ which was directly influenced by the earlier show and also curated by Ippolito⁵.

While Kevin Teixeira (1994: 9) echoed Lee Rosenbaum’s suggestion of the “public loving it”, musician Thomas Dolby (one of the artists featured in the exhibition) observed that “For the first few days the Guggenheim had lines around the block, such was the allure of VR in those days. Unfortunately the crowds dwindled as word of mouth spread that the graphics were nothing to write home about” (2007). Consequently, the exhibition could be argued as having played into the “overstating hype” that much coverage of virtual reality was guilty of at the time, misleadingly suggesting that the virtual reality technology that was on display was “fully developed” (Briggs, 1996).

Jenny Holzer - *World One and World Two*

The greatest hype at the Guggenheim exhibition surrounded Jenny Holzer’s contributions. Riding on the momentum of winning the Golden Lion for her 1990 installation at the Venice Biennale and her critically acclaimed solo exhibition at the Guggenheim the previous year, Holzer became the focal point of much of the marketing for ‘Virtual Reality’ both prior to and after the exhibition. A brief write-up of the exhibition in the January/February 1994 edition of *Flash Art* mentions only Holzer and “recording artist Thomas Dolby” among the “creative minds involved in these projects” before going into a slightly incorrect⁶ précis of Holzer’s work for the remainder of the article (Flash Art, 1994: 43). Another retrospective article in *Art & Design* by Intel’s Kevin Teixeira is unsubtly titled, *Jenny Holzer-Virtual Reality: An Emerging Medium* (1994: 8-15), despite being an overview of the exhibition as a whole. This is somewhat accounted for by Holzer’s status as the only practicing fine artist involved in the exhibition

This move also resulted in criticism from some circles, most notably Jaron Lanier who suggested that (at least in 1994) “[t]here hasn’t been any virtual reality art made yet, in my opinion, and the way museums and other patrons have handled virtual reality is stupid and insulting to the artists. They’ve defined the importance of the artists in regard to their celebrity rather than their work” (Pinchbeck, 1994). While his point may be somewhat valid, Lanier’s statements do seem unduly dismissive, especially in the case of Holzer who evidenced a conscious effort to engage with the medium.

Holzer’s foray into virtual reality had been on the cards since her first allusion to virtual reality in a 1991 interview with Nicholas Zurbrugg. When asked whether she was “planning to explore new technologies such as virtual reality”. Holzer’s response was:

I’m interested in virtual reality, but I don’t know enough. I want to try to talk to some of the companies that are researching this to see if there’s anything I can use [...] If I find anything that I can use, I suspect I will present the usual themes, the survival themes. I can’t quite imagine what it will look like, since I haven’t seen enough of virtual reality, except the bad movie versions! [...] I want to use virtual reality to highlight some issues, to try to make the problems that actually are here seem real to people, all over again [...] If high tech gets the message across, it would be stupid to turn your back on it (Zurbrugg, 2004: 220).

5 At the time of writing, the online catalogue for this exhibition still exists, see: (artnetweb, 1996).

6 Incorrect in that the description patches together aspects of both of her works into a single piece.



Fig 7. Jenny Holzer *World One* (1993).



Fig 8. Jenny Holzer *World One* (1993).

While Holzer's response highlights both the curiosity and uncertainty surrounding virtual reality at the time (as well as the assistance of "bad movie versions" in promoting this curiosity), what is most interesting is her expression of a practical desire to use the medium to "get a message across" and to make concerns "seem real to people". For a medium often alluded to in escapist terms, wishing to make the antithesis - concerns affecting physical reality - appear "more real", marks a novel interpretation of the term "virtual reality". It also demonstrates a keen understanding (for someone uninitiated) of the principles of immersion as being convincing to the senses of the perceived reality of computer-simulated environments.

The following year, Holzer was interviewed by Janine Cirincione in the catalogue for Cirincione's previously-mentioned curated exhibition 'Through the Looking Glass' at the Jack Tilton Gallery, despite not having anything specific to do with the exhibition itself. In the interview, entitled *Activity can be Overrated*, Cirincione begins with the information that Holzer was "about to begin work on a virtual reality project" (1992b: 25).

1993 saw the arrival of 'Virtual Reality' at the Guggenheim, with Holzer being the only artist to present more than one work. As with all of the works in the exhibition, the two pieces were immersive Head-Mounted Display based virtual reality installations and were simply titled, *World One* (1993) and *World Two* (1993). True to her word, Holzer's contributions were in keeping with her *modus operandi* despite being realised with a new medium. Her signature truisms and aphorisms are recognizable in the works, realised in speech this time as opposed to text, and originating from a more defined source than the anonymous voice in her previous text-based work.

World One was produced in collaboration with virtual reality engineer Ken Pimentel. The work situates the viewer within the interior of a large ochre torus inhabited by floating "Cubeheads" [Fig 7-8], as Holzer refers to them in a Studio for Creative Inquiry documentary on the Guggenheim exhibition (1993a). Inspired by Samuel Beckett's short story, *The Lost Ones*⁷ (1972), these Cubeheads are representative of souls that interact with the viewer either by engaging with them or fleeing. In engaging with the viewer, the Cubehead's animated face would state one of Holzer's truisms (Teixeira, 1994: 14). Lanier's criticism is somewhat applicable here as the talking Cubeheads mark a slightly tenuous incorporation of Holzer's truisms into an interactive and immersive virtual reality world.

World Two, produced with programmer Jeff Donovan, drew from Holzer's *Lustmord*⁸ series of works and, like that series, forms a response to the violence enacted against women in the Bosnian war. Decidedly truer to the notion of a "world" than the previous work, the immersant finds himself/herself negotiating a desolate landscape characterised by constantly-shifting acid tones. As one traverses this terrain of muddy earth and stark sky, small clusters of huts emerge on the horizon [Fig 9-10]. One enters these huts to find them all but abandoned were it not for ghostly voices conveying one sentence stories alternating between the perspective of the "perpetrators, victims and witnesses of rape and murder" during the Bosnian war (Ippolito, 1993: 5).

Consistent with Holzer's initial statement in 1991 that she would like to use virtual reality to "try to make the problems that actually are here seem real to people" (Zurbrugg, 2004: 220), Kevin Teixeira suggests that the piece drives the point home far more effectively than a news broadcast or other media channel could: "You are

7 Beckett's short story (centred on lost bodies mindlessly wondering the expanse of a temperature-fluctuating cylinder) has also been the inspiration behind a more recent installation by CAVE innovator Jeffery Shaw (in collaboration with Sarah Kenderdine) entitled *UNMAKEABLELOVE* (2008). This will be discussed in the third chapter of this thesis.

8 A word with "no precise English equivalent but which Holzer says, translates roughly from the German as 'rapeslaying'" (Simon, 1994: 80)



Fig 9. Jenny Holzer *World Two* (1993).

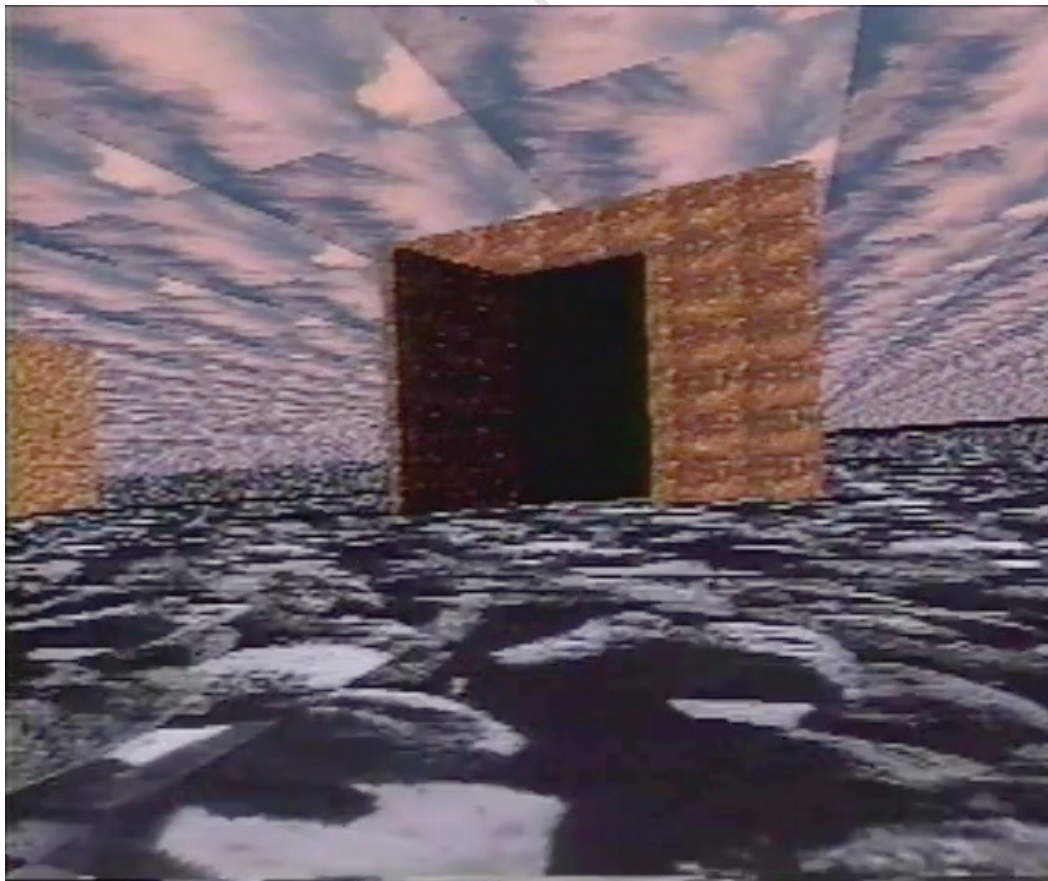


Fig 10. Jenny Holzer *World Two* (1993).

not watching this on television, you are here. You are a silent witness to the devastation” (1994: 15).

Furthermore, both of Holzer’s works (and particularly *World Two*) increase the perception of being within and exploring a virtual world through a satisfying level of interactivity (within the internal logic of the pieces). Jon Ippolito notes that a number of pieces were turned down for inclusion in the show because “no matter how many times you entered them you would get the same experience, like using a video game”, whereas in Holzer’s work “the user was a co-creator of the experience. You had the ability to enter a world many times and have different experiences each time” (quoted in Teixeira, 1994: 15). One could argue that this is a feature inherent in most installations, but not on the scale presented in *World Two*.

The combination of a vast, desolate spatial environment with the haunting audio effect of the spoken lines resulted in *World Two* very effectively translating Holzer’s concerns into something best realised through the medium of virtual reality. This view is similarly expressed by self-proclaimed “poet laureate” of virtual reality, Dan Duncan, in a review of the exhibition for the journal ‘Virtual Reality World’:

What Holzer’s brilliantly disturbing work proves once again is that [...] virtual reality technology, like paint in a tube, can only be validated by an artist whose vision is beyond the technology she is using (Quoted in Teixeira, 1994: 15).

Holzer’s overall vision most certainly did go beyond the technology as *World Two* ultimately proved to be only a part of the *Lustmord* project, continuing the following year with a physical installation exhibition of the same name at the Barbara Gladstone Gallery in New York in 1994, and including transcribed versions of some of the spoken lines that are heard in the huts into text. It should be mentioned that this version (and other realisations of the *Lustmord* project) was very different to *World Two*. In contrast to the sprawling landscape of the virtual reality work, the Gladstone version incorporated a single claustrophobia-inducing structure resembling a cathedral that was situated in the centre of the exhibition space and bathed in red LED light [Fig 11]. A group exhibition that travelled between Munich and Barcelona in late 1994 - 1995 entitled ‘Rosebud’ (also including early immersive “virtual landscapes” by Matt Mullican), featured screen captures from Holzer’s *World Two* with some of the more affective lines superimposed across the centres in red [Fig 12] (Tarantino & Wilmes, 1994: 33-45).

Holzer’s two works are indicative of a very successful early foray, in terms of polysensory immersion, into an interactive virtual world facilitated by a HMD. That Holzer never returned to the medium can perhaps be attributed to the fact that the anticipated onset of virtual reality into the home environment has yet to really take place. “I think working with VR gives you a prayer of keeping up with what will be in everyone’s house, of getting some kind of toe-hold, and of having some impact into what VR will become” (Cirincione, 1992b: 28).

Thomas Dolby - *The Virtual String Quartet*

Musician Thomas Dolby opted for a slightly different approach to the polysensory nature of virtual reality immersion in his *Virtual String Quartet* (1993). Dolby was a recording artist who had enjoyed a 1982 hit with *She Blinded Me with Science* before focusing more on session musician work and production, and was the second most recognisable name on the Guggenheim exhibition’s roster. Dolby shared Holzer’s interests in the public accessibility of the medium, stating that he wished to undertake a project that would make virtual reality appealing to “your grandmother” and the “cross-section of the Guggenheim audience” (Studio for Creative Inquiry, 1993a). As a result, the work revolved around a quartet of virtual musicians performing Mozart’s

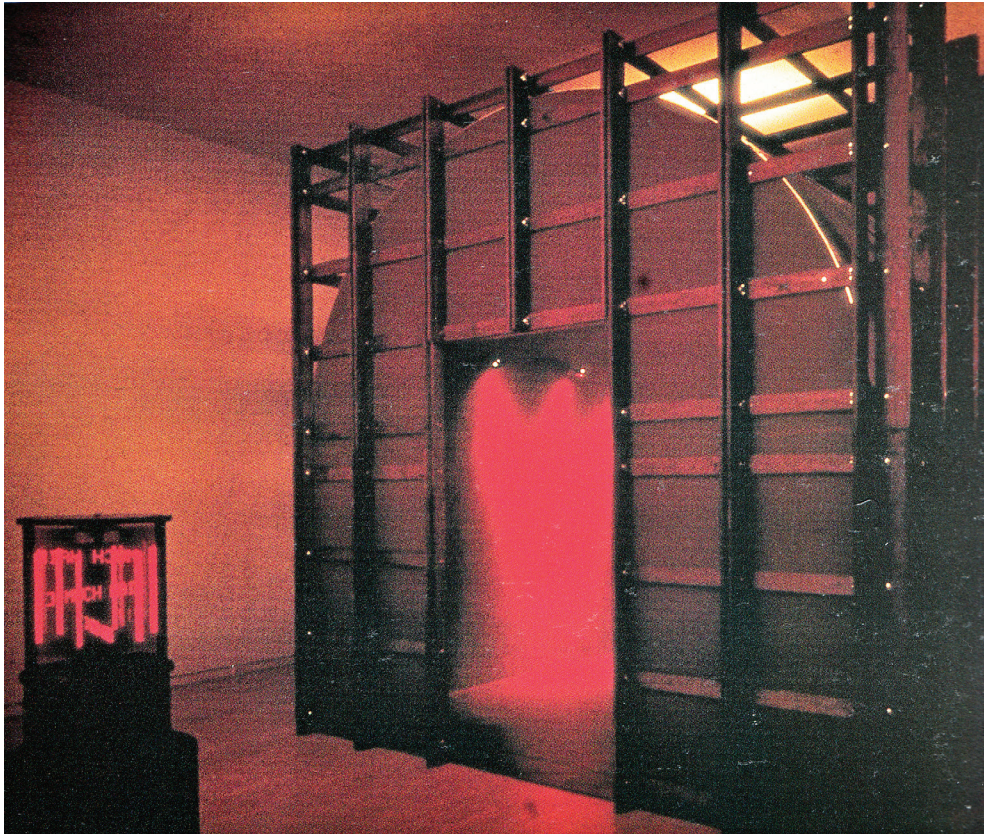


Fig 11. Installation view of Jenny Holzer *Lustmord* (1994).



Fig 12. *Lustmord* presented as an LED sign for the 'Rosebud' exhibition. The text reads "I bite her closed again".

Quartet no.21 in D Major.

Developed in collaboration with Eric Gullichsen and the Turtle Island Quartet (who were motion-captured to produce the animation) the work initially situated the immersant within the centre of a 9x9ft space [Fig 14]. The immersant was then free to move around within this virtual space, and the quadrophonic sound would adjust accordingly to assist this perception of movement. If, for instance, the immersant moved towards the cellist, the sound would adjust accordingly and the cello would (as in physical reality) feature more prominently in the audio mix in comparison to the violins and viola.

Crucial to Dolby's work was the role of sound in facilitating the immersive experience of the piece and shaping the work's virtual geography. "The graphics [...] running on IBM 286 machines that barely measured their speed in gigahertz, were jerky low-res and ran at a few frames a second" (Dolby, 2007). In response to this, Dolby's hypothesis was that while the graphical capabilities of the hardware at the time left much to be desired, there was little excuse for poor sound. Consequently the audio was emphasised in order to compensate for the visual shortcomings while producing an immersive experience that was appealing to the viewer. "High quality audio makes people perceive visual displays to have higher resolution, while the converse is not true" (Laurel, 1993:207).

Should they have been sufficiently compelled, immersants were also able to approach and "tickle" any of the musicians using the trigger on the joystick. This interactive feature would lead to the musician, "[starting] to play variations in another musical style—for example, Appalchian bluegrass—while the other three musicians [stick] with the Mozart" (Dolby, 2007). The viewer could only distract one musician at a time, meaning that there were four different variations at any given moment depending on the soloing musician. Alternatively the immersant could "just enjoy the Mozart" (Teixeria, 1994: 14).

The above points about Dolby's approach - sound compensating for lacklustre visuals and a shifting, mutable audio experience that assists in defining the sense of virtual space within the environment - are significant in challenging Ken Hillis's assertion of the "subordinate senses" of sound and touch within virtual reality. In *Digital Sensations*, Hillis suggests that:

Sounds in VE are...always the same for any one situation. When the cupboard door in the virtual kitchen is opened, it always goes "woosh." When closed it always goes "thunk". In this, digital sounds in a VE operate as "aural icons" (1999: xxii).

Hillis goes on to quote audio theorist Steve Jones, who stated that "the very jargon of VR excludes the aural" and that "the creation of VR can be understood as part of the ongoing technological visualisation and deauralization of space" (Jones, quoted in Hilis, 1999: xxii).

Hillis's point is that sounds within virtual reality are often static and lack the dynamism that should be present within something attempting to virtually create some form of "reality". The term "aural icons" suggests that the sounds function as placeholders rather than as elements that emerge appropriately from the (virtual) properties of the space in which they occur. The argument therefore is that while the visual space develops an inhabitable complexity, the audio space remains affixed as onomatopoeia (if a tree falls in a virtual forest and nobody is there to hear it, it still loads *tree_fall.wav* and goes "thud").

Dolby's work is the antithesis of the visualisation/deauralization of space as it not only uses sound to define the viewer's location within a virtual space, but also allows for this sound to be mutable. Thus as opposed to the sound being a fixed, predetermined clip that is unalterable and persistent; the viewer can dynamically modify



Fig 13. Thomas Dolby *Virtual String Quartet* (1993). View of a visitor immersed in the work at 'Virtual Reality: An Emerging Medium'.



Fig 14. Thomas Dolby *Virtual String Quartet* (1993)



Fig 15. Thomas Dolby *Virtual String Quartet* (1993).



Fig 16. Thomas Dolby *Virtual String Quartet* (1993).

the nature of the sound in real time. *Virtual String Quartet*, is an example of what Meredith Bricken refers to as an “acoustigraphic” environment, one in which “both ambient and localized sounds are coordinated with the graphical representations and the movements of the participant” (1991: 368).

In opposition to Hillis and Jones’s suggestion, Frances Dyson argues that “It could be said that, metaphysically, cyberspace has already been filled with sound, and VR is already an ‘aural’ medium” (1996: 73). Dyson’s argument is complex, but the main point is that while what is seen at any given moment is framed by one’s field of vision, the soundscape of a particular environment is something that envelopes one in 360°. In other words, sounds can come from any source in an individual’s surrounds, irrespective of which direction they are facing. The way the sound is heard will be affected by the direction in which it is travelling in relation to the person hearing it, as well as this person’s distance from the source of the sound. This is what causes sound to have a spatialising quality.

Dyson’s argument extends that something such as surround sound pre-empts immersive virtual reality in terms of convincing the immersant’s senses that they are surrounded by an artificially constructed space. Allucquère Rosanne Stone uses President Franklin Delano Roosevelt’s radio “fireside chats” as an example of this immersive experience, suggesting that “Roosevelt used the radio as a machine for fitting listeners into his living room [...] because of it, people were able to think of presence in a different way [...] it was now possible for millions of people to be ‘present’ in the same space-seated across from Roosevelt in his living room” (1991: 87).

Ultimately, this trajectory opens a can of worms that exceeds the scope of the discussion at present. For now, suffice it to say that sound has not been left behind in virtual reality’s development as a medium. The degree of complexity of the audio component of a work is going to vary from artwork to artwork, depending on how important the sound is in realising the intentions of the artist(s).

Maxus Systems International - *The Metaphor Mixer*

The remaining two works in ‘Virtual Reality’ are less easily situated within an art context. The main factor for consideration within this context is exhibition within an art institution, rather than the intention of the works’ inceptors.

Earlier it was suggested that the greatest hype in the Guggenheim exhibition was evoked by Jenny Holzer’s contributions. While this is certainly true from the fine art perspective, Maxus Systems International’s *The Metaphor Mixer* (first unveiled in 1991) had also generated more than its fair share of hype, with three years’ worth of sporadic niche media attention from the likes of *The Wall Street Journal*, *Forbes*, *Business Week* and *American Banker*. The “media coverage” section of the Maxus Systems International website identifies no less than 29 articles in mainstream publications about *The Metaphor Mixer* prior to the ‘Virtual Reality’ (2007). Arguably *The Metaphor Mixer* comes the closest to explicitly employing a Gibsonian cyberspace model of virtual reality. At its core, Gibsonian cyberspace is defined by two primary traits. The first is disembodied immersion in a metaphorical computer dataspace (as far as Gibson’s protagonist in his genre-defining novel *Neuromancer* is concerned, “The body [is] meat” (Gibson, 1984: 6))⁹. The second is that this dataspace is globally networked¹⁰.

In one of but a handful of explicit descriptions of it within *Neuromancer*, Gibson proffers cyberspace as:

A consensual hallucination experienced daily by billions of legitimate operators, in every nation [...]

9 The accuracy of this assertion will be looked at in detail in the next chapter.

10 This will be the topic of discussion in Chapter Four.

A graphic representation of data abstracted from the banks of every computer in the human system. Unthinkable complexity. Lines of light ranged in the nonspace of the mind, clusters and constellations of data. Like city lights, receding [...] (Gibson, 1984:51)

While *The Metaphor Mixer* does not resemble “city lights, receding”, it nonetheless incorporates a similar translation of data into visual metaphor that is immersively navigated and interacted with. The model of interactivity is once again shifted in comparison to the exhibition’s other pieces. Rather than attempting to catch entities, explore a war-torn landscape or interfere with maestros, interaction in this case is a process of drawing connections between the data as it is presented in a multidimensional space (which I will discuss below).

In contrast to Dolby’s *Virtual String Quartet*, the work relies far less on sound and more on the visualisation of data. The *Metaphor Mixer* formulates a virtual world composed of financial data sets that are not only rendered visually but are also perpetually in motion. The data is animated to reflect changes in financial indicators in real time. In this way, *The Metaphor Mixer* plays into what Tom Corby refers to as the specific benefit of computer-based “Information Visualisation (IV)”:

By translating data into pictures, with IV we aim to capitalize on humans’ natural ability to spot patterns and relationships in visual fields (cognition). This enables an intuitive identification of structures, which would not be available if presented in purely numeric form (2007: 462).

The Gibsonian cyberspace model of virtual reality has further implications for this aspect of the work. Elaborating on this, N. Katherine Hayles suggests that:

To make this space work as a level playing field on which humans and computers can meet on equal terms, Gibson introduces his second innovation. Cyberspace is created by transforming a data matrix into a matrix in which narratives can happen [...] The genius of *Neuromancer* lies in its explicit recognition that the categories Kant considered fundamental to human experience, space and time, can be used as a conjunction to join awareness with data (1993: 83).

What Hayles means is that the viewer is located not only within the spatiality of the visual representation of the data, but also within the temporal dimension. As stocks shift and financial indicators rise or fall, Corby’s notion of “cognition” comes into play. The viewer is far more aware of the significance of these occurrences over time in relation to the system as a whole because multiple variables can be presented simultaneously. The changes in the system therefore assume a narrative quality over time that would be lacking had the data been presented purely numerically. The work visualises four dimensions simultaneously: three spatial dimensions and time (which is represented by the changes in the system that occur in real time).

While *The Metaphor Mixer* has been cited here as being explicitly Gibsonian, the cyberspace of Gibson’s work is in no way limited to representing business data. Above all, it is about disembodied immersion within a networked computer dataspace. Nonetheless, the world of the “Sprawl”¹¹ in *Neuromancer* could be described as a corporate-driven dystopia, with much of Gibson’s protagonist Case’s previous work as a hacker requiring him to “penetrate the bright walls of corporate systems, opening windows into rich fields of data” (1984: 5). Gibson’s conception of cyberspace lends itself to the visualisation of these types of data.

At the risk of belabouring the point, the character Slick Henry observes in Gibson’s *Mona Lisa Overdrive* that:

People jacked in so they could hustle. Put the trodes on and they were out there, all the data in the

11 In Gibson’s fictional work, The Sprawl is a colloquial street name for the Boston-Atlanta Metropolitan Axis (1984:43), a massive dystopic urban sprawl encompassing much of the United States East Coast from Boston, Massachusetts to Atlanta, Georgia.



Fig 17. Maxus Systems International *The Metaphor Mixer* (1991- present).

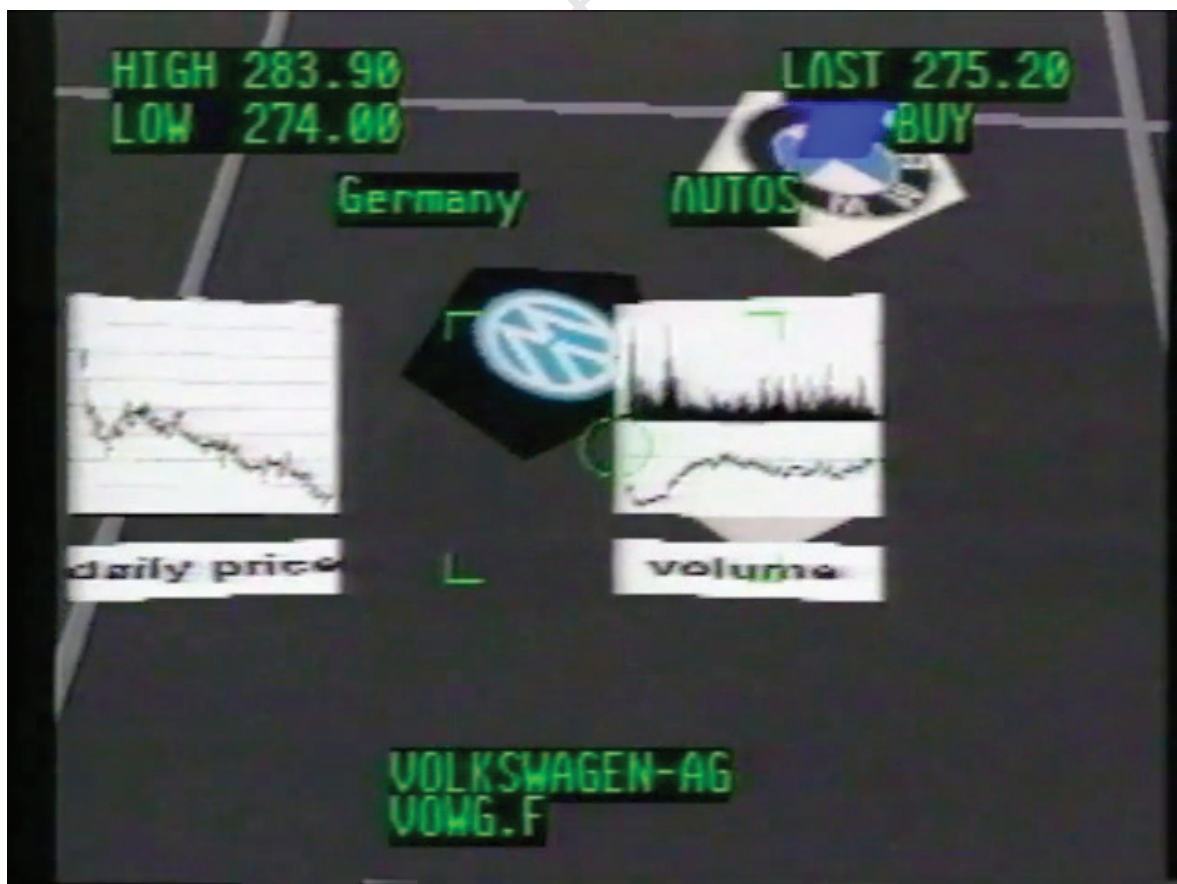


Fig 18. Maxus Systems International *The Metaphor Mixer* (1991- present).

world stacked up like one big neon city, so you could cruise around and have a kind of grip on it, visually anyway, because if you didn't, it was too complicated, trying to find your way to a particular piece of data you need (1988: 16).

Carl Loeffler and Lynn Holden - *The Networked Virtual Art Museum: The Temple of Horus*

The only work on the show that presented immersion in a networked space was Carl Loeffler and Lynn Holden's, *The Networked Virtual Art Museum: The Temple of Horus* (1993). "Networked immersion" is used here to mean that two HMD-attired viewers were able to be immersed simultaneously within the virtual world and were able to view a virtual depiction (avatar) of each other moving around within it [Fig 20]. Working at the Studio for Creative Inquiry at Carnegie Mellon University, Loeffler (the virtual reality director at Carnegie Mellon) and Holden (an Egyptologist brought in for the project) clearly viewed the work to be but a small part of a much larger education project: the development of a globally accessible "interconnected, siteless museum" (Ippolito, 1993:2). In keeping with the museum motif, a Studio for Creative Inquiry (1993b) documentary on the project reveals that the Egyptian wing in the work is one of at least three wings in the central museum hub (the other two wing entrances that can be seen are the "Leonardo" wing and an automobile showroom). These additional wings were replaced with walls inscribed with the production credits in the Guggenheim exhibition's version of the work.

The work, composed of an imagined reconstruction of a 4,000 year old temple to the Egyptian god Horus, used photographs of the carvings and murals inscribed on the ruins of the temple as source material. The work is undoubtedly the most ambitious of the five pieces in its attempt to simulate an environment drawn from physical reality. The other works opted for heavy visual stylisation which arguably worked in their favour. The jagged edges of the textures of Holzer's landscape, for example, read more as scars or fractures than as technical deficiencies, seemingly in keeping with the theme of her work. As Holzer suggests, "So much of art-making is about reducing things to the essentials, so I don't feel particularly crippled by this. I don't want it to look natural because then I would be making a documentary film" (Snider, 1994). In contrast, an immersive and interactive documentary appears to be exactly what Loeffler and Holden were striving for. From this perspective, the work was attempting something that lay outside of the technological means available to it.

Taking a cue from Dolby's work, *The Temple of Horus* also attempted to increase the immersive nature of the work by incorporating ambient audio effects. Hillis's aural icons are definitely applicable in this instance, both in terms of the sound effect-like nature of the livestock noises and the somewhat cliché, stereotypically "Egyptian" musical soundtrack. John Belton suggests that in cinema, the soundtrack resides within a "secondary representation" that is charged with conveying something specific about the scene rather than functioning as anything that is gleaned from "objective reality" (1985:66). In this case, the music serves to imply a simulacrum of 'Egyptianness' as opposed to presenting the viewer with a reasonable estimation of the soundscape of the presented scene.

Regardless, the real draw-card of this work was its networked aspect. On paper at least, the way in which this networked component of the work was exhibited in 'Virtual Reality' may have been a missed opportunity to demonstrate something truly exciting to the public at the time, namely the global networking implied in their "interconnected siteless museum". As presented at the exhibition, the two networked installations were physically located next to each other, which benefited the viewers by halving the waiting time to view the work (instead of there being one set of virtual reality equipment there were instead two sets installed). However this may have hindered the wonder of being co-present in the virtual environment. Simultaneous access from elsewhere around the globe would have marked a far more impressive demonstration of the project's ultimate

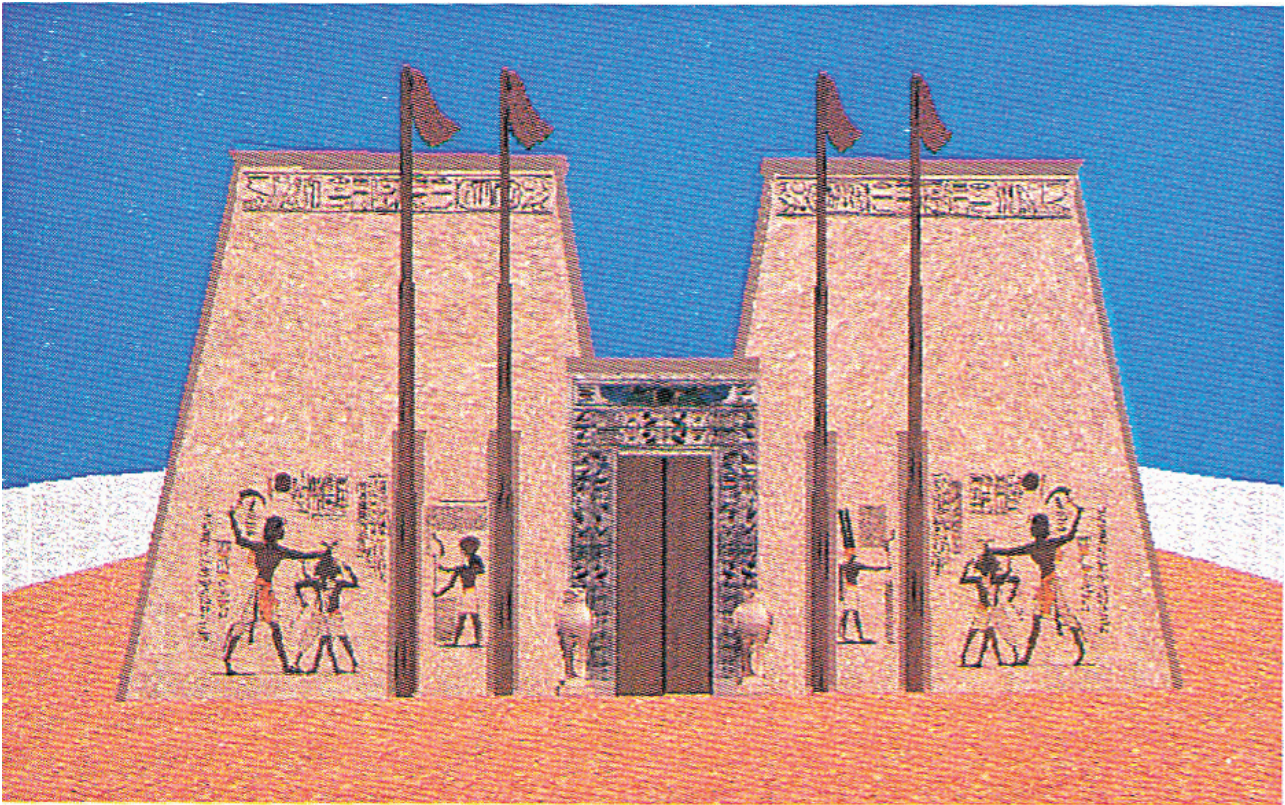


Fig 19. Carl Loeffler and Lynn Holden *The Networked Virtual Art Museum: The Temple of Horus* (1993).

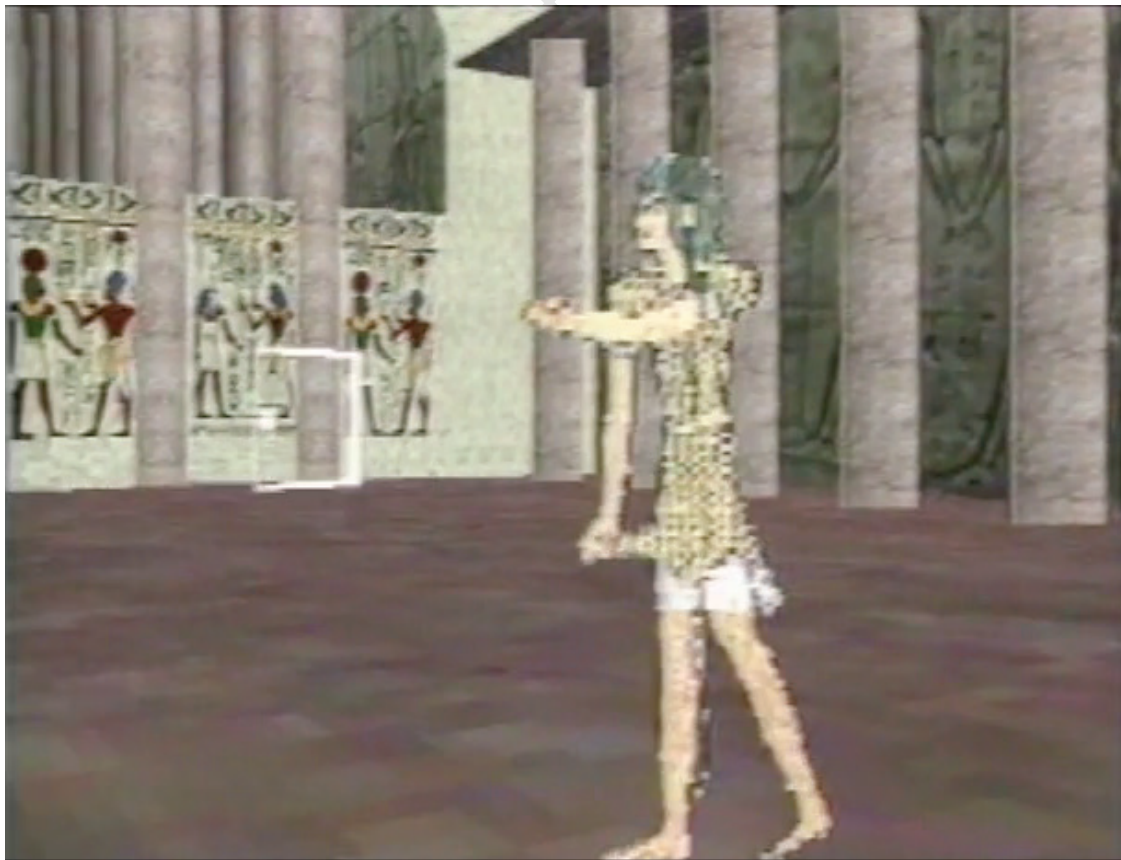


Fig 20. Carl Loeffler and Lynn Holden *The Networked Virtual Art Museum: The Temple of Horus* (1993). View of the other immersant's avatar.



Fig 21. Carl Loeffler and Lynn Holden *The Networked Virtual Art Museum: The Temple of Horus* (1993).

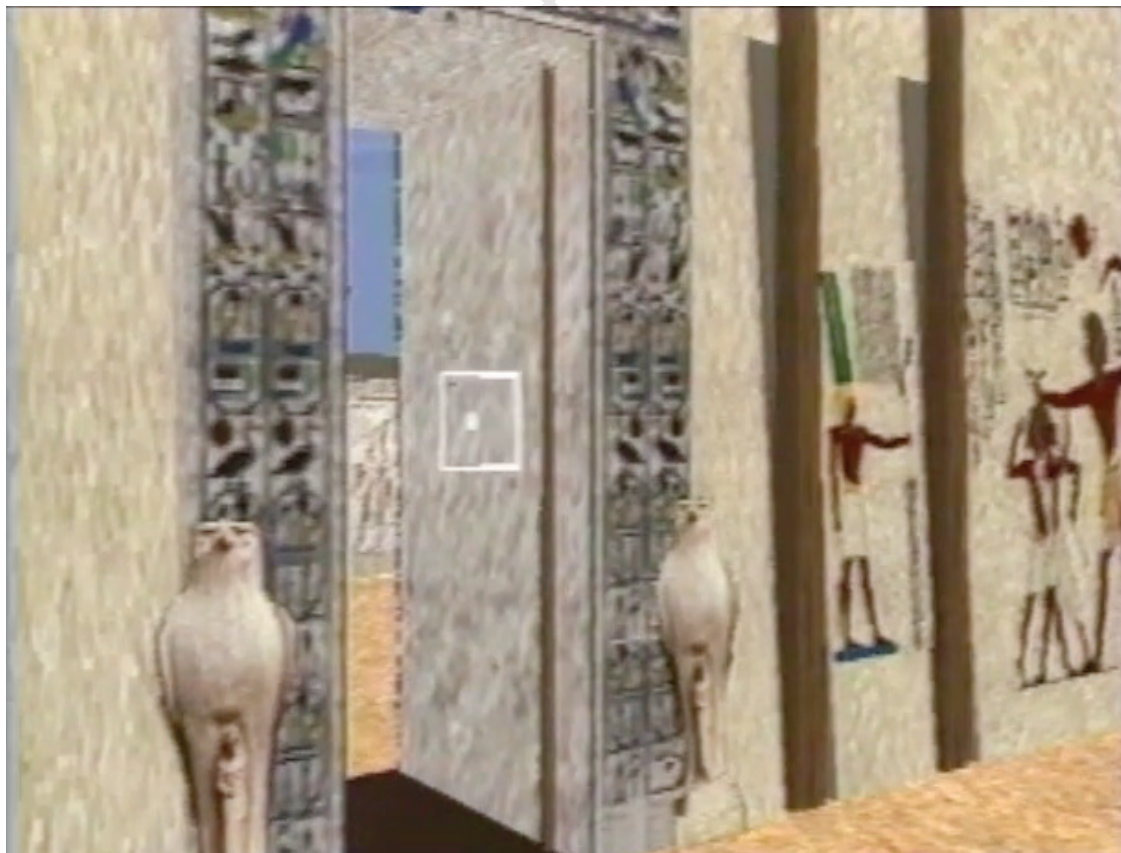


Fig 22. Carl Loeffler and Lynn Holden *The Networked Virtual Art Museum: The Temple of Horus* (1993).

destination. The team responsible for the piece had in fact successfully achieved a public test of their network internationally the previous year between Carnegie Mellon University in Pennsylvania and a Virtual Reality conference in Germany in September 1992 (Pimental & Teixeira, 1993: 283).

The “ultimate destination” of the project warrants further understanding of the effects that this networking has on the immersants’ experiences of the work. Given the educational intentions embedded in the notion of a museum, how are these intentions furthered by networked immersion? This question was partly addressed in dialogues that took place in a 1968 conference entitled, ‘Computers and Their Potential Applications in Museums’. In an essay entitled *The Future of the Museum as a Learning Environment*, Robert S. Lee details a series of experiments to increase the level of engagement with museum exhibits. Lee observes that:

In contrast to the public school...the museum provides a rich opportunity for direct meaningful experience with things. It is a setting where experiential learning can take place [...] As compared with books, lectures, or pictures, exhibits can offer the drama of firsthand contact, of a vivid, immediate experience, and of the reality of a phenomenon (1968: 374).

Lee goes on to describe an experiment to make a very poorly-received exhibit on crystallography more appealing by using computers. Through a series of successful tests, they came to the conclusion that “*Interaction* was the key- not the superficial mechanical interaction of pressing buttons, but the more engrossing interaction of cognitive and emotional engagement with a responsive environment” (1968: 378)[original emphasis]. As to what this has to do with networking, Lee later suggests that a major fault of their computer-aided museum exhibit was that it “only deals with one person at a time”, noting that the visitor was “psychologically...quite separated from his companions, and this is undesirable” (1968: 379). Lee’s point is that the social aspect of museum exhibits that subvert the line between work and play within a “responsive environment” set up the constituents for an effective educational experience.

This is wholly relevant to Loeffler and Holden’s work; *The Networked Virtual Art Museum* was developed with education firmly in mind, and its interactive aspects were specifically designed to convey information. For instance the murals come to animated life when the viewer is in close proximity to help the viewer understand the information contained within the hieroglyphics [Fig 22]. Somewhat like Corby’s cognition (but in an extremely literal sense), the animations make explicit what Egyptologists believe the hieroglyphics to convey. The work thus extends the perception of Lee’s “drama of firsthand contact, of a vivid, immediate experience”, albeit through a virtual reconstruction.

It is not without a sense of irony within the context of this chapter that I would like to conclude by noting a review of the conference records from ‘Computers and Their Potential Applications in Museums’ by Edward F. Fry (then associate curator of the Solomon R Guggenheim museum). In a paragraph referring to Massachusetts Institute of Technology (MIT) professor J.C.R. Licklider’s *Computer Graphics as a Medium of Artistic Expression* (1968), which was a remarkably prophetic suggestion of where virtual reality technology would eventually go from Ivan Sutherland’s work, Fry notes that:

Professor Licklider in particular falls victim to the fairly widespread fallacy that computer graphics represent a new dispensation of art in the cybernetic age, and that such graphics represent an authentic marriage of art and technology (1970: 360).

It may have come as a shock to him to learn that 23 years later, his own institution would be housing an exhibition declaring these computer graphics to be a valid and emerging medium.

In the exhibition pamphlet for ‘Virtual Reality’, Jon Ippolito stated that: “Although virtual reality is still in its

infancy, each of the five virtual worlds presented here suggests a direction that this emerging medium might take” (1993: 1). The directions included in the exhibition can be surmised as: politically-motivated, emotive works that enhance the reality of specific concerns; visual multidimensional representations of abstract data; emphases on the immersive potential of other sensory stimulus besides the visual; and simultaneous immersion within a networked virtual world. That all of these can be traced in the subsequent development of immersive virtual reality within an art context, suggests that the Guggenheim exhibition was in fact an effective declaration of an emerging medium.

CHAPTER TWO

THE EMBODIED/DISEMBODIED VIRTUAL REALITY IMMERSANT

“My everything has been amputated!”

-John Perry Barlow on his first virtual reality experience (Hayles, 1996: 1)

“For Case, who’d lived for the bodiless exultation of cyberspace, it was the Fall

[...] The body was meat. Case fell into a prison of his own flesh.”

-William Gibson, *Neuromancer* (1984: 6)

As mentioned in Chapter One, a central aspect of Gibsonian cyberspace entails disembodied immersion within a virtual dataspace. The concept of disembodiment emerges early in *Neuromancer* (1984) in relation to the book’s protagonist, Case’s, inability to return to cyberspace. Having stolen from a former employer, he has been surgically rendered incapable of jacking-in to the matrix¹ as punishment. Returning to the second opening quotation, this is why he perceives himself to be relegated to a “prison of his own flesh”. The implication here is that cyberspace is the realm of “bodiless exultation”, where the mind is emancipated from the constraints of the physical body’s “meat” and instead set free to roam. It is in the sense of there being a distinct separation between what could be termed “meatspace” and “cyberspace” (Mitchell, 2003: 3) that Gibsonian cyberspace can be said to be disembodied.

The question of whether the disembodiment inherent in Gibson’s fictional model of cyberspace is in fact a fundamental property was hotly debated in early virtual reality discourse, with arguments both for disembodiment (Lanier, 2011: 106) and against it (Hayles, 1996:1; Stone, 1991:111). This chapter will discuss the implications of the term in specific relation to the immersive CAVE and Head-mounted Display (HMD) virtual reality systems. Thereafter, the discussion will be applied to a series of immersive virtual reality artworks that explicitly engage with notions of the virtual body. As will become apparent, different practitioners and theorists apply the term in slightly different, idiosyncratic ways. Finally the chapter will look to the Kantian sublime in concluding the debate as to whether or not immersive virtual reality can be called an embodied or disembodied medium.

“Disembodiment” as it is used in the virtual reality context is distinct from any theosophical notion of “the state of a person supposed to continue to exist after their bodily death” (Blackburn, 2008: 102), as the Oxford Dictionary of Philosophy defines “disembodiment”. None of the works under discussion lay claim to instilling “bodily death” in the immersant, so this definition serves rather to highlight the alleged separation of person/body. This can be secularly extended into what Char Davies refers to as the “rational Cartesian mind/body split” (quoted in Heim, 1998: 162). As alluded to above in William J. Mitchell’s dichotomising of Gibson’s cyberspace between meatspace and cyberspace, the idea is that because virtual reality is a realm of information where everything that is experienced is constructed, it is a haven for the mind. When the mind is immersed in cyberspace, the body is reduced to “something quite disposable and generally, limiting” (Randal Walser, quoted in Rheingold, 1991: 191).

1 Not to be confused with Larry and Andy Wachowski’s film *The Matrix* (1999). In Gibson’s work, “the matrix” is used interchangeably as a term for cyberspace.

N. Katherine Hayles argues that while testimonies for disembodiment are accurate in the sense that “the body remains in front of the screen instead of in it”, they are also “deeply misleading, for they ignore the crucial role that the body plays in constructing cyberspace. In fact, we are never disembodied” (1996:1). Allucquère Rosanne Stone concurs, stating that “No matter how virtual the subject may be, there is always a body attached” (1991: 111).

It is not difficult to see where they are coming from. For instance, the tracking software located within the technology of the HMD and CAVE is entirely dependent on the body and its movements for information. Beyond that, a large part of being able to make sense of and negotiate virtual environments is through the understanding derived from “our bodies [carrying] knowledge accumulated through years of unconscious experiment” (Heim, 1998: 30). There is also the “secret sixth sense” of proprioception, the “continuous but unconscious sensory flow from the movable parts of our body (muscles, tendons, joints), by which their position and tone and motion are continually monitored and adjusted” (Sacks, 1985: 43). This will be returned to later in this chapter.

Even within Gibson’s work, which first introduced this idea of disembodiment into popular consciousness, the importance of the body in relation to virtual immersion is evidenced. For instance, in Gibson’s sequel to *Neuromancer*, *Count Zero* (1986)², there are two instances which strongly echo Hayles’s point regarding the necessity of the external physical body in cyberspace. Early in the book, prior to facilitating an illegal defection of a top scientist, a team of hired mercenaries assess their preparation for commencing the mission:

“Ramirez says that he can’t do anything too strenuous this close to jacking in. You ask me, he’s just a lazy little L.A. shit.”

“No,” Turner said, getting up from his seat on the ledge, “he’s right. If he sprained his wrist, we’d be screwed. Even something so minor that he couldn’t feel it could affect his speed...”

Webber shrugged. “Yeah. Well he’s back in the bunker, bathing his hands in the last of our water and humming to himself, so we should be just fine” (Gibson, 1986:91).

The fact that Ramirez’s physical body, in the form of his hands, needs to be preserved prior to jacking-in to cyberspace in order to maintain maximum efficiency certainly points to a stronger relationship between the body and the immersed mind than mere “meat” would allow for. This point is driven home in the book’s climax when the character Jammer’s fingers are shot off prior to crucially jacking-in. His associate Beauvoir immediately hands the reins over to “console cowboy” in training Bobby: “You’re in luck, Bobby,” Beauvoir said... “cause brother Jammer, he ain’t gonna be punching any deck...” (Gibson, 1986: 191). Again Hayles’s point persists; without the appropriate physical body appendages, Jammer is rendered incapable of interacting with cyberspace.

Adding a potentially new dimension to the relationship between the physical body and virtual reality systems is a relatively new piece of technology, the EPOC neuroheadset by Emotiv [Fig 23]. As the name implies, the headset is capable of reading and interpreting brainwaves making the implications of the device considerable as it effectively removes much of the physical body from the equation. The technology potentially allows individuals to transcend their physical limitations while interacting with virtual environments (if one were to be paralysed for instance). Even then though, the mind that emits the brain waves is presumably snugly housed within “meat” (barring any philosophical skepticism-like scenarios of a brain in a vat) and is incapable of surviving without it. And what else could the brain itself be except “meat”? For the purposes of this discussion, the fact

2 The second title in the Sprawl trilogy that is concluded with *Mona Lisa Overdrive* (1989).



Fig 23. Emotiv's EPOC neuroheadset.

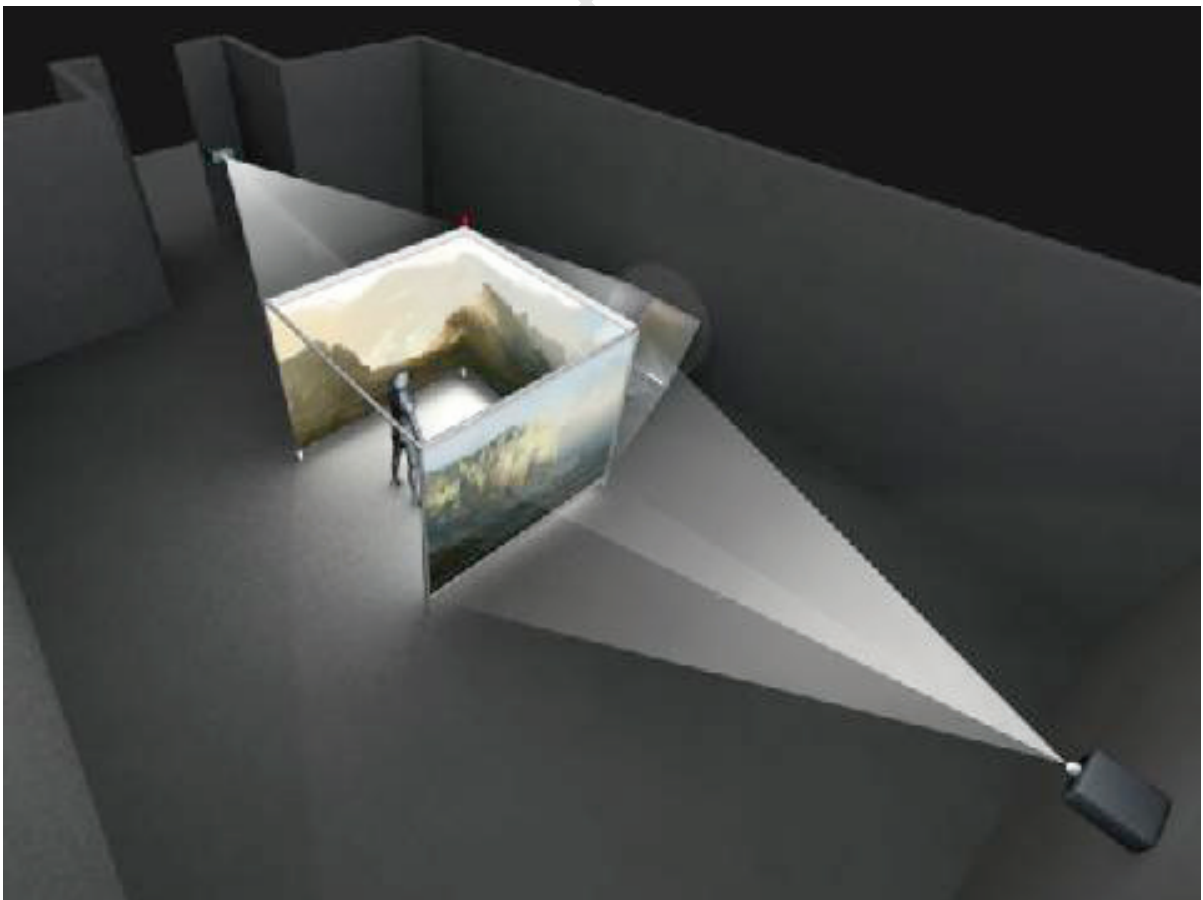


Fig 24. Illustration of how CAVE's rear-projection functions.

that the EPOC neuroheadset has not been utilised within immersive virtual reality artworks yet, renders it relevant to this discussion only insofar as it points to the intriguing possibility of stimulating ventures in the future of the medium³.

In the meantime, we must turn our attention to works that explicitly emphasise either an embodied or disembodied viewer, as well as works that fundamentally incorporate a relationship between the viewer and the immersed virtual body. The discussion begins by looking at notions of disembodied and embodied immersion in relation to CAVE and HMD technology.

CAVE and HMD Virtual Reality Systems: Distinctions in relation to the body

CAVE, purely from a base technological perspective, is fundamentally a more embodied medium than HMD. “In CAVE, two or more users may look around as they wish. They need not be represented virtually, because they represent themselves physically” (Sandin, DeFanti & Cruz-Neira, 1993: 271). Within CAVE, regardless of the number of simultaneous immersants, the body with which one navigates the virtual environment is one’s own⁴. That the virtual environments in CAVE are displayed on screens independently of the immersant’s movements [Fig 24] also helps to alleviate “the loss of equilibrium or even nausea” (Sandin, DeFanti & Cruz-Neira, 1993: 271) that can result from HMD usage if the rate at which the HMD updates the user’s viewpoint is unable to match the speed at which the user moves his/her head.

Referring to HMD immersion as “tunnel immersion”, Michael Heim suggests that the HMD:

shrouds the user’s head much like the hood that covers the head of a pet falcon [...] HMD immersion results from the primary body’s blackout for the sake of the cyberbody, and a tunnel-like perception of the virtual world is the consequence. The user flies into a virtual environment with maximum immersion, but the intensity of immersion strips away self-awareness (Heim, 1998: 100-101).

This notion of the physical body being intrinsically linked to self-awareness (and a lack of self-awareness being tied to tunnelled sensory deception) extends back to Plato’s *Allegory of the Cave*. There, the deceived prisoners were specifically required to have “their legs and necks so fastened that they can only look straight ahead of them and cannot turn their heads” (The Republic, VI, 514a-b).

In an HMD-based virtual environment, the body that is inhabited within the virtual world is entirely constructed. There can even be an implied lack of a body altogether, as in the case of works where the viewer flies spectre-like through the landscape⁵. With networked HMD virtual environments where viewers are intended to be able to see each other coexisting in the world, a virtual representation of each immersant needs to be rendered. These representations were referred to as avatars in the previous chapter. Consequently, group experiences of HMD works become decidedly complex and require substantial computing power. This resource-heavy approach has the benefit of allowing each immersant to be equally active within the virtual environment.

In CAVE systems by comparison, it is usually only the primary immersant (the lead viewer) who is tracked and thus has the onscreen perspective responding to his/her movements in the CAVE system. Often this is a matter of practicality, i.e. how can the CAVE render relative viewpoints for each immersant? The other viewers

3 A technical demonstration of this remarkable device can be found in Emotiv-founder Tan Le’s Ted Talk (TEDtalksDirector, 2010).

4 An exception to this is the mannequin controller/avatar in Agnes Hegedüs, Berndt Lintermann and Jeffrey Shaw’s *ConFiguring the Cave* (1997), to be discussed later in this chapter, but even there it veers more towards an eccentric vehicle simulation than anything resembling disembodiment.

5 An example is the “floating weightless” viewer of Matt Mullican’s *Five Into One* (1991) (Hagen, 1992: 1).

are sensorially immersed, but cannot affect the viewpoint; they are passive and cannot interact. *ConFiguring the Cave* (discussed later in this chapter) and Maurice Benayoun's *World Skin* (1998) (discussed in the next chapter) are notable exceptions in this respect.

Brenda Laurel and Rachel Strickland - *Placeholder*

Brenda Laurel and Rachel Strickland's *Placeholder* (1993) presented an HMD-based scenario where two immersed participants at a time assumed the role of different animal characters. Another character (often Laurel herself) served as a guide that was heard as an omnipresent voice by the two immersants. The type of vision, capacity for movement and the environments that could be traversed that make up the immersants' experience of the work were altered and shaped according to which of the possible character roles (Snake, Fish, Crow and Spider) the immersants chose to assume. Heim calls these the "first person features of the primary animal world" (1998: 78). As an example, Fish was confined to the water, whilst Crow was unable to enter the water but could navigate the environments through flying through the air. Likewise the immersant's visual experience of the environment shifted in order to be appropriate to the animal type that was being embodied [Fig 27-28]. The immersants viewed each other in the virtual environment as stylised icons resembling their selected animal.

The work was produced as part of the 'Arts and Virtual Environments Project' at the Banff Centre for the Arts in May 1994, and was set in the surrounding Banff National Park, Canada. The three virtual environments that could be explored within the work were modelled on actual locations in the park, "a cave and waterfall in Johnston Canyon, and a formation of hoodoos⁶ overlooking the Bow River" (Strickland & Laurel, 1996: 297). Correspondingly, the choice of the animal characters and their icons were derived from their usage and importance in aboriginal tales rooted in the area.

In their artist's statement, Laurel and Strickland refer to the animal bodies that the viewer can inhabit as

smart costumes, altering more than the appearance of the people wearing them[...] A person visiting the world could assume the character of one of these spirit animals and thereby experience aspects of its unique visual perception, its locomotion and its voice (1996: 298).

This experience of the animals' voices was achieved through voice filters attached to the microphones in the HMDs that would alter the immersants' voices in real time. The voice filters contributed to the sense of inhabiting another body; the surprise of hearing one's own voice was heightened by hearing a completely different, unexpected voice. In the 13-minute documentary footage of the work, there is a moment in which an immersant (experiencing the piece as crow [Fig 29-31]) laughs, exhibits evident surprise at hearing the distorted effects of the voice filters, and proceeds to unleash a (rather successful) array of attempted crow noises (Strickland, 1993). Hayles attaches gender connotations to these voice filters: "Crow sounds raucous and masculine, spider wise and feminine, whereas snake and fish are gender indeterminate" (1996: 17).

The question thus extends as to what degree the immersant has been disembodied and re-embodied within the smart costumes. In other words, to what extent is the immersant's subjectivity projected into the "smart costume" and how much remains rooted in physical reality? Part of the answer lies in observations by Jaron Lanier in *You Are Not a Gadget* (2010) and by Jim Blascovich and Jeremy Bailenson in *Infinite Reality* (2011), both of which detail the psychological effects of an altered body avatar while immersed in virtual reality.

Blascovich and Bailenson describe the work of Nick Yee, a research scientist who, whilst working towards his

6 Large column-like rock formations.

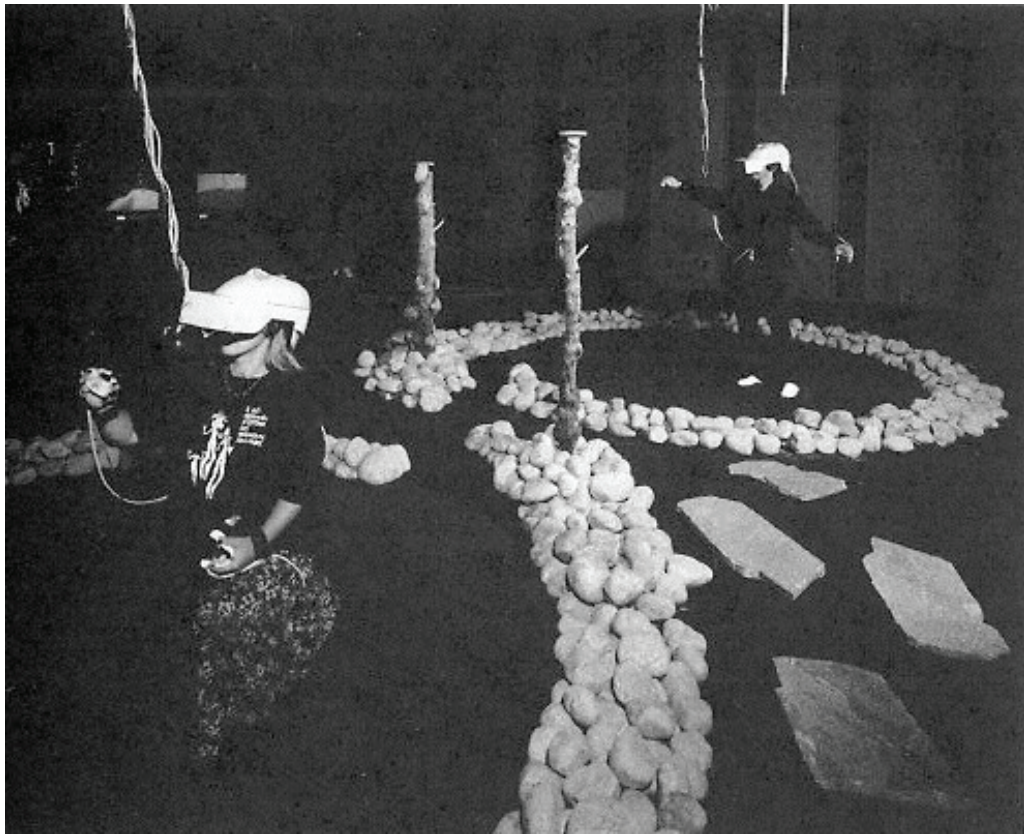


Fig 25. Brenda Laurel and Rachel Strickland *Placeholder* (1993). Installation view.



Fig 26. Brenda Laurel and Rachel Strickland's *Placeholder* (1993). The cave that immersants begin their experience inside. Here spider (left) and fish (right) can be seen.

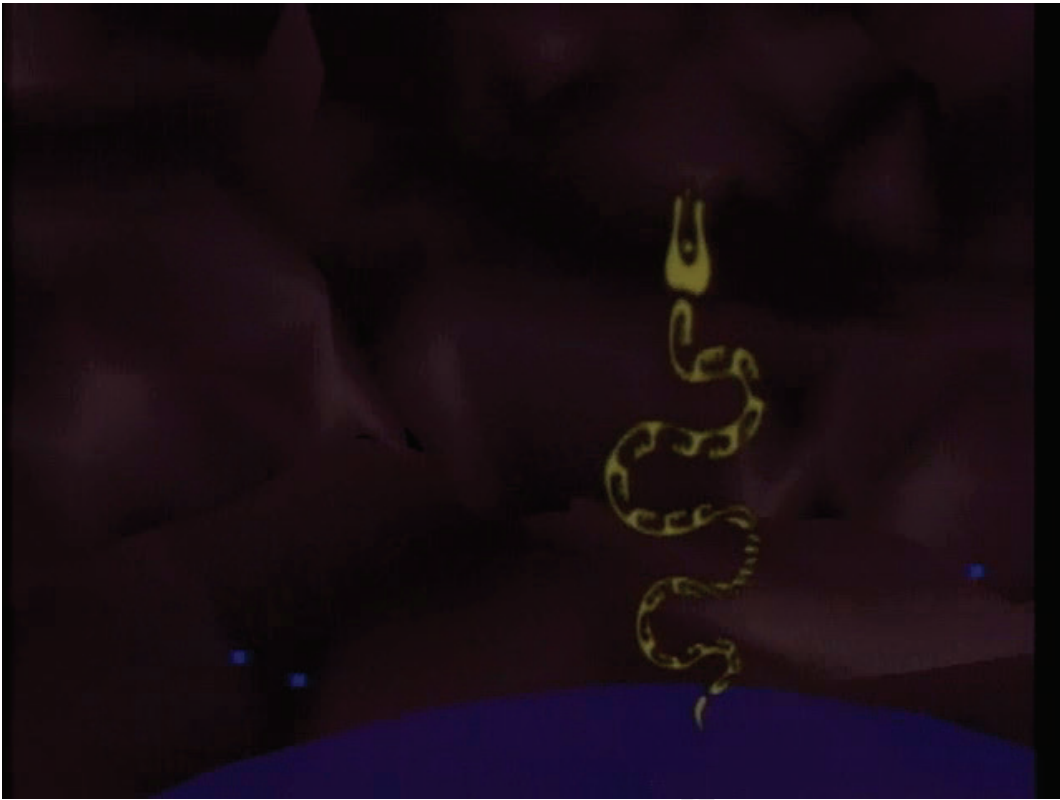


Fig 27. Brenda Laurel and Rachel Strickland *Placeholder* (1993). The immersant moves towards the snake smart costume.



Fig 28. Brenda Laurel and Rachel Strickland *Placeholder* (1993). Once a smart costume has been assumed, the immersant's experience of the virtual environment changes. Having become snake, the immersant now has infrared vision.

Ph.D. “[used] immersive virtual reality as a platform for conducting experiments in social interaction and self-representation” at the University of Stanford’s Virtual Human Interaction Lab (Yee, 2000-2007). Participants in Yee’s studies would be assigned virtual reality avatars with certain traits that were either accentuated or diminished (the avatar’s height or attractiveness for instance) before being required to engage in various simulated social situations. The results of the tests concluded that the assigned avatars had a direct psychological effect on the participants. “Even though participants did not consciously realise that their avatars were shorter or taller in virtual reality, they exhibited psychological effects typically associated with their virtual stature” (2011:106). Furthermore, “the confidence instilled by taller avatars persisted outside of virtual reality” (2011: 106).

Lanier (often credited with coining the term, “virtual reality”) describes his early experiments with designing virtual bodies, explaining that the catalyst for this particular line of inquiry was a programming bug that caused his hand to appear enormous within a virtual world, like “a web of flying skyscrapers” (2010: 186). This programming fluke led to the discovery that “people could quickly learn to inhabit strange and different bodies and still interact with the virtual world” (2010: 186). Lanier began to experiment with increasingly extreme examples of strange bodies that immersants could attempt to control, most notably a lobster with three small midriff arms on either side of its body. Astonishingly, Lanier deduced that “people can in fact learn to control virtual bodies with extra limbs” (2010: 186- 187). It should be mentioned that the smart costumes in *Placeholder* did not achieve the same degree of complexity as Lanier’s lobster, where elbows and knees were required to facilitate the movement of the extra limbs.

Thus one’s subjective experience of perpetuating the movement of a simulated, virtual body can be directly at odds with the bodily “knowledge accumulated through years of unconscious experiment” to which Michael Heim referred (1998: 30). That subjectivities can be shaped by the experience of being within a specific type of avatar does suggest a more complicated relationship between the body and mind. Lanier takes this a step further:

When you are in VR [...] you are no longer aware of your physical body. Your brain has accepted the avatar as your body [...] But actually, because of homuncular flexibility, any part of reality might just as well be a part of your body if you happen to hook up the software elements so that your brain can control it easily. Maybe if you wiggle your toes, the clouds in the sky will wiggle too. Then the clouds would start to feel like part of your body [...] The body and the rest of reality no longer have a prescribed boundary. So what are you at this point? You’re floating in there, as a centre of experience. You notice you exist, because what else could be going on? I think of VR as a consciousness-noticing machine (2010: 187).

Here, Lanier differs from Hayles and Stone’s arguments; suggesting that behind every moving body there is a mind (or “consciousness” in this case). The difference between this position and Hayles’ and Stone’s is that the moving body in this instance can be based in either physical or virtual reality, whereas the body in Hayles’ and Stone’s scenarios operates in physical reality.

Agnes Hegedüs, Berndt Lintermann and Jeffrey Shaw - *ConFiguring the CAVE*

Agnes Hegedüs, Berndt Lintermann and Jeffrey Shaw’s *ConFiguring the CAVE* (1997) situated multiple immersants within a CAVE-based installation. A mannequin had been placed in the centre of the CAVE and this was used to control and alter the nature of the seven virtual environments that the immersants could move through during the course of the work [Fig 32]. As in all of the works under discussion in this chapter, it is the



Fig 29. Brenda Laurel and Rachel Strickland *Placeholder* (1993). Immersants in physical reality. The immersant to the left has assumed the smart costume of crow and is flying in the virtual environment.

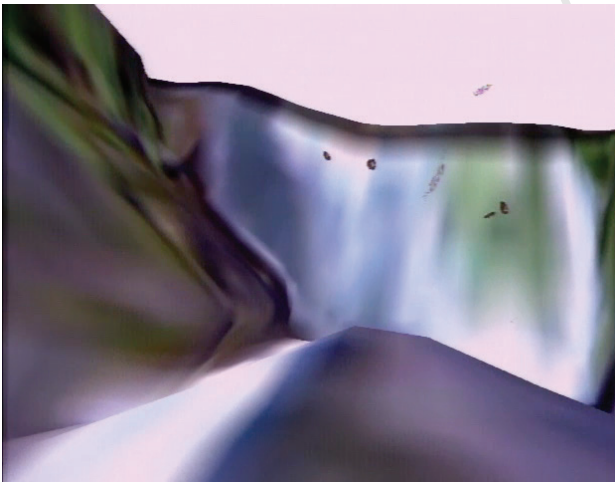


Fig 30. Brenda Laurel and Rachel Strickland *Placeholder* (1993). The same immersant's view in the virtual environment. He is flying around the Johnston Canyon waterfall. Below in the water, the other immersant is interacting as fish.



Fig 31. Brenda Laurel and Rachel Strickland *Placeholder* (1993). The same scene viewed from the perspective of the other immersant (fish), who is confined to the water. Crow can be seen flying in the top right corner.



Fig 32. Agnes Hegedüs, Berndt Lintermann and Jeffrey Shaw *ConFiguring the CAVE* (1997)



Fig 33. Agnes Hegedüs, Berndt Lintermann and Jeffrey Shaw *ConFiguring the CAVE* (1997)

interaction between the body and the virtual environment that is central to the work. In this instance, however, this body is external to the viewers and can be manipulated by multiple viewers simultaneously. The body itself resembled a life-sized drawing mannequin and could be posed in the same ways as one. Supported by a waist-high pole in the centre of the space, the often abstract projections on the walls of the CAVE could be controlled by moving the mannequin's body, limbs and joints.

Embedded within the work was a bizarre sense of displacement; the sensory stimuli that surround one can only be manipulated by moving the body of another. As mentioned earlier, the work has connotations to an eccentric virtual reality vehicle simulator, one wherein the body itself functions as vehicle. "Movement of the puppet's body and limbs dynamically modulate various parameters in the image and sound generating software, while particular postures of the puppet cause specific visual events to occur" (Shaw, 2002).

In a sense, *ConFiguring the CAVE* simultaneously recast viewers as both the puppet masters within Plato's *Allegory of the Cave*, and the prisoners – both those who "[carry] all sorts of gear along behind the curtain-wall, projecting above it" conjuring visual mistruths within the shadows (The Republic, VI, 514c-515a), and those who are deceived by their senses into believing in the reality of what they see. In the switching of roles within the allegory there is also empowerment, akin to returning to the cave with the conscious intention of manipulating objects in front of the fire specifically because of the entrancing visual outcome. The allegorical scenario that Plato describes is flipped on its head, becoming a creative, interactive one when (as the title suggests) the viewer is bestowed with agency and placed in the position of being able to "configure the cave".

In establishing empowerment, a reciprocal disempowerment is also implied. An aspect of the work that was (perhaps intentionally) lost in *reConFiguring the CAVE* (2001), the adapted version of *ConFiguring the CAVE*⁷, was the inherent violence that at times emerged in the manipulation of the mannequin in the original. *reConFiguring the CAVE* replaced the actual mannequin with an LCD touchscreen that featured a digitized version of the mannequin as the primary interface [Fig 35]. The original work had situations where the immersants became so lost in the immersion that the mannequin would be forcefully pushed and pulled around as it became nothing more than an interface to interact with the display on the screens; the body connotations were completely lost. This was especially the case when more than one person was interacting with the mannequin. Kristine Stiles suggests that "the gender of the slender puppet, while ostensibly androgenous, may be read as female" (2003: 496), further noting that "A vicariously sinister aspect of the pleasure and wonder experienced by steering the puppet occurs when someone else manipulates the figure [...] Capturing the gaze and dislodging viewers from their intimate interconnections renders the puppet a mere thing, an object" (2003: 497).

In this respect, *ConFiguring the CAVE* also looks at the body that is left behind in the so-called event of disembodiment. Protagonist (and anti-heroine) Molly's description of her previous work as a sex "puppet" in *Neuromancer* comes to mind: "Once they plant the cut-out chip, it seems like free money. Wake up sore, sometimes, but that's it. Renting the goods is all. You aren't in, when it's all happening. House has software for whatever a customer wants to pay for" (Gibson, 1984: 147). In this (fictional) scenario, the body is temporarily vacated by the sensorium and leased for whatever "the customer wants to pay for". However, as is becoming apparent in this discussion, there is no clean severance between mind and body, and "worktime starts bleeding in" as "bad dreams" and "memories" (Gibson, 1984: 147).

7 It was exhibited as part of the 'Future Cinema' exhibition that ran between 16 November 2002 - 30 March 2003 at ZKM Center for Art and Media, Karlsruhe.

While the more common term “avatar” has been used throughout this paper to refer to the representation of the immersant’s body within the virtual environment, the term “puppet”, as in Molly’s description of her prior occupation, was frequently used in the late 80s and early 90s to mean the same thing (Hillis, 1999: 219). There is, however, a distinction between the puppet of *ConFiguring the Cave* and the “smart costumes” in Laurel and Strickland’s work. In both cases the “puppets” are empty vessels awaiting an immersed participant to animate them, in order to facilitate navigation of a virtual environment. In *ConFiguring the Cave* the viewer manipulates the mannequin at one remove in physical reality, while in *Placeholder*’s virtual world, one assumes the body of Crow directly flapping one’s arms wildly in correspondence with the virtual impression of flight.

The distinction seems to be embedded within the terms that the artists themselves have used in describing their work, “puppets” in Hegedüs, Lintermann and Shaw’s case and “costumes” in Strickland and Laurel’s. A costume is worn directly, while a puppet’s body is other and separate. The costume is assumed, whereas the puppet is animated. The costumed individual enacts a role; the puppet is manipulated by others in order to fulfil a role.

Put another way, the difference may lie in critical distance as understood in Immanuel Kant’s notions of perception and apperception. Michael Heim defines the distinction between the two as “with perception we see something. With apperception we notice *that* we are seeing something” (1998: 100) [original emphasis]. The implication of this is that *ConFiguring the CAVE* plays into apperception in that the separation between the physical body and the immersive virtual world is made visible through the intermediary presence of the mannequin body. As such, the work allows for critical reflection on the nature of virtual sensory immersion while still being experienced as an immersive virtual reality environment. *Placeholder* immerses the viewer directly into the role of one of the animals and is therefore perceptive. As far as the immersant and their experience is concerned, he/she does not cause crow to fly from some separate point. He/she *is* crow and *they* are the one flying.

Apperception implies a reflectedness, a proprioception, a self-awareness of what we are perceiving or doing [...] Kant also believed that apperception makes possible a critical attitude toward what we perceive. Once we sense our separation from a stimulus, we can then enjoy the option of responding to it in various ways, or perhaps even choose not to respond at all (Heim, 1998: 100).

Diane J. Gromala and Yacov Sharir - *Dancing with the Virtual Dervish: Virtual Bodies*

This notion of apperception as a self-awareness of the actions of our physical bodies is taken further in *Dancing with the Virtual Dervish: Virtual Bodies* (1994), a collaboration between Diane J. Gromala (an artist) and Yacov Sharir (a professional dancer) that incorporates a labyrinth of multi-layered juxtapositions of virtual and physical bodies. The initial virtual environment that the immersant finds himself/herself in is a large skeletal human torso floating within abstract space [Fig 36]. Projected onto this abstract space and located throughout the work is streaming footage of a dancer, Sharir, who is also immersed in the work. The work is negotiated by pointing in the direction that one wishes to travel while wearing a DataGlove and “flying” there. The bones of the torso’s rib cage are lined with multi-coloured texts; “Gromala’s musings on body pleasure and pain” [Fig 37] (TransformingPainTV, 2010).

Particularly relevant to the work is Oliver Sacks’s account of *The Disembodied Lady*⁸. In it, Sacks details the tribulations of Christina, “a strapping young woman of twenty seven [...] robust, in body and mind” (Sacks,

8 Credit goes to N. Katherine Hayles for pointing to this story (1996: 22).



Fig 34. Agnes Hegedüs, Berndt Lintermann and Jeffrey Shaw *ConFiguring the CAVE* (1997)



Fig 35. Agnes Hegedüs, Berndt Lintermann and Jeffrey Shaw *reConFiguring the CAVE* (2001). Note that the mannequin has been replaced with a digital version on the screen in front of the immersant.



Fig 36. Diane J. Gromala and Yacov Sharir *Dancing with the Virtual Dervish: Virtual Bodies* (1994)

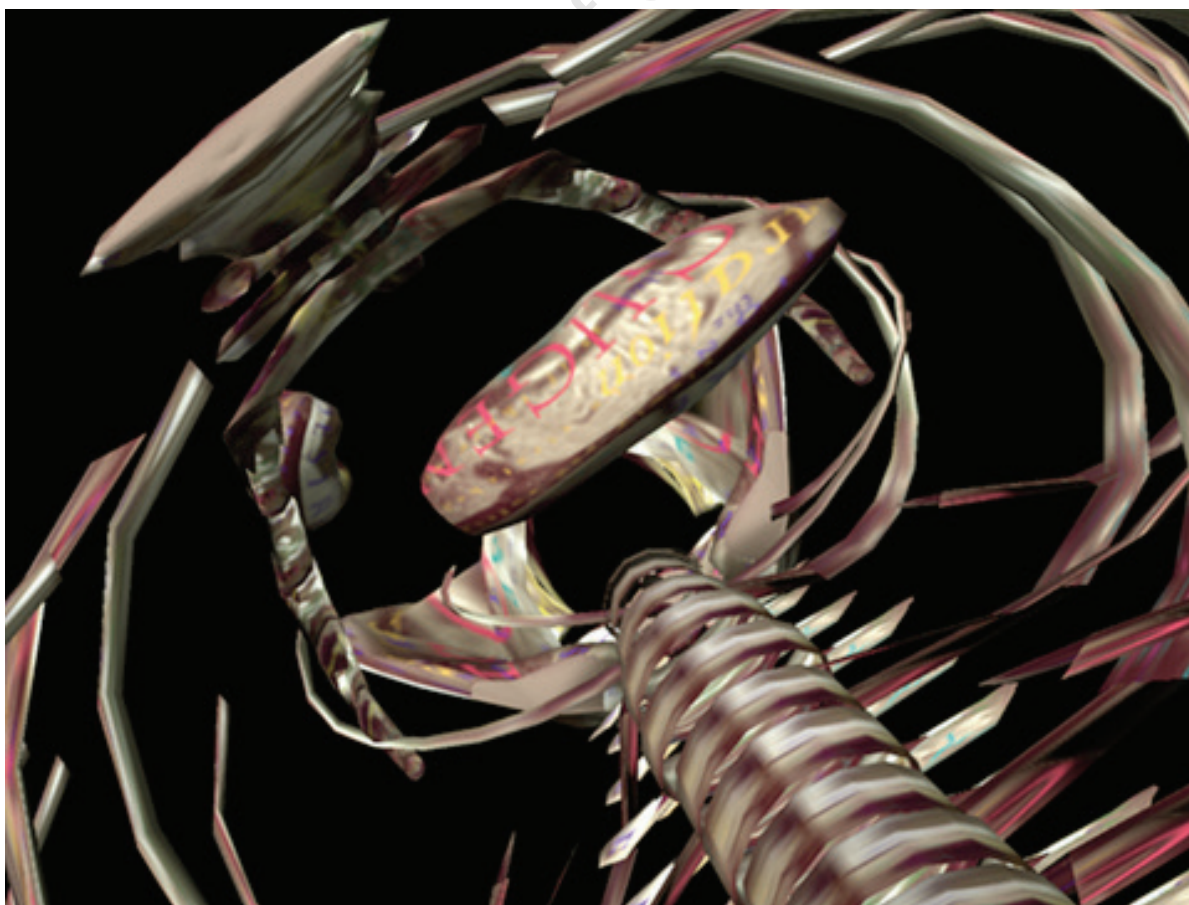


Fig 37. Diane J. Gromala and Yacov Sharir *Dancing with the Virtual Dervish: Virtual Bodies* (1994)

1985: 43) who progressively loses her proprioceptive sense after being admitted to hospital for abdominal pains. To reiterate, the proprioceptive sense is the:

continuous but unconscious sensory flow from the movable parts of our body (muscles, tendons, joints), by which their position and tone and motion are continually monitored and adjusted[...] for it is only by courtesy of proprioception[...] that we feel our bodies as proper to us[...] as our own (Sacks, 1998: 43).

“The only difference between [our bodies] and the rest of the reality that [we] are experiencing is that [we] already know how to control [our bodies], so it happens automatically and unconsciously” (Lanier, 2010: 187). Having lost all sense of the location of the movable parts of her body, Christina literally feels disembodied. The feedback loop that allows her to “automatically and unconsciously” control her body is lost.

Christina’s real world torture is the inverse of Case’s fictional hell. Where Case longs for the “bodiless exultation” of cyberspace and is “trapped in a prison of his own flesh”⁹, Christina is locked outside of herself, “condemned to live in an indescribable, unimaginable realm - though ‘non-realm’[...] might be a better word for it” (Sacks, 1985: 50).

The relevance of Christina’s horrific ordeal to *Virtual Bodies* lies in Diane J. Gromala’s recount of her “first technologically mediated virtual experience”; lying awake during surgery and “watching [her] own viscera being altered and manipulated on the big screen in a research hospital” (Gromala & Sharir, 1996: 282). Like Christina, she found herself looking at her body with no specific proprioceptive connection to it. The difference, however, is that Gromala was looking at a technologically mediated, interior view of her body and was disconnected from it due to the anaesthesia.

Thus for Gromala there is a sense of reclamation in constructing a virtual replica of her body from the vast archive of X-rays, MRI scans and sonograms that she had accumulated through years of treatment for chronic pain. Being immersed within this virtual reconstruction of her own body, Gromala intended to “reappropriate, reinhabit, reclaim and reconstitute fragmentary representations of [her] body and in turn to offer this reinscription and reconfiguration of [her] body as a virtual stage for both a dancer [Yacov Sharir] and audience interactors” (Gromala & Sharir, 1996: 282). This is something that is denied to Christina who, through her continuing loss of proprioception, feels “that her body is dead, not real-not hers - she cannot appropriate it for herself” (Sacks, 1985: 50).

In *Observations on the Feeling of the Beautiful and Sublime* (2011), Kant speaks of the importance of the viewer’s perspective in formulating the sort of sublime aesthetic experience that one can encounter: “A great height is just as sublime as a great depth, but the latter is accompanied with the sensation of shuddering, the former with that of admiration; hence the latter sentiment can be terrifyingly sublime and the former noble” (17). From this assertion, it follows that the same colossal structure, for instance, could be experienced alternatively with a sublime sense of terror or admiration depending on whether one is located at the base looking up or at the pinnacle gazing down.

Virtual Bodies plays with this notion by switching the viewer’s perspective from the exterior, where the body is viewed as a finite, contained whole, to an interior where it becomes a vast, seemingly infinite and sprawling structure. Entering bodily organs only increases the scale of the virtual body. “When a user enters an organ like

⁹ Joe Bonham’s quadruple amputee, “locked-in syndrome” as a result of an artillery shell explosion in Dalton Trumbo’s, *Johnny Got His Gun* (1938), also comes to mind.



Fig 38. Diane J. Gromala and Yacov Sharir *Dancing with the Virtual Dervish: Virtual Bodies* (1994). Entering bodily organs (in this case the heart) results in the immersant being transported to even larger environments.

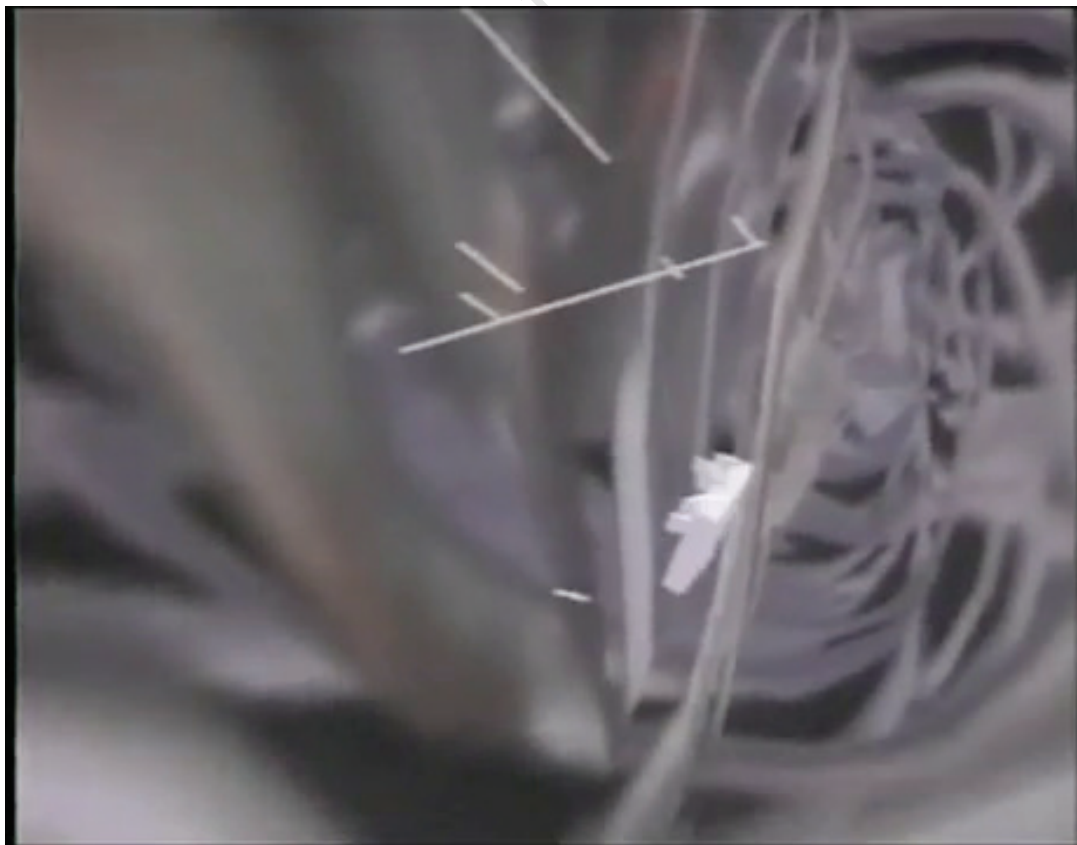


Fig 39. Diane J. Gromala and Yacov Sharir *Dancing with the Virtual Dervish: Virtual Bodies* (1994). The heart environment that the immersant entered in Fig 37.



Fig 40. Diane J. Gromala and Yacov Sharir *Dancing with the Virtual Dervish: Virtual Bodies* (1994). View of Yocav Sharir in physical reality, dancing while immersed in the work.



Fig 41. Diane J. Gromala and Yacov Sharir *Dancing with the Virtual Dervish: Virtual Bodies* (1994). Views of Sharir dancing in physical reality can be seen throughout the virtual environment.

the heart, a larger more surreal world unfolds. In this sense, the body unfolds into larger worlds within” [Fig 38-39] (TransformingPainTV, 2010). In this sense there is a continuous shifting between the aesthetic notions of the sublime and the beautiful.

Elaborating further, in *Solitude and the Sublime*, Frances Ferguson suggests that “we love what is beautiful for submitting to us, for being less than we are; we react with dread and awe to what is sublime because of its appearing greater than we are, for being *more*, and making us acknowledge its power” (1992: 8-9)[original emphasis]. Faced with this, there is a great contrast in the usage of the body from *ConFiguring the CAVE* to *Virtual Bodies*. Where *ConFiguring’s* mannequin is defined, contained and submissive to manipulation, the body space in *Virtual Bodies* is expansive, growing ever larger and unknown as the immersant explores it further.

An experience such as Gromala’s lends itself to classification as terrifying sublime; in a moment of utter powerlessness, she found herself confronted with her own mortality. There is also a paradox that emerges from the perspective of the sublime. If faced with the prospect of a vast, seemingly infinite space, one (by Kant’s account) comes to an understanding of one’s own mortality and inferiority in the face of nature. If the “nature” that one is presented with is one’s own body, then, as in Gromala’s case, one is being dwarfed by one’s own body. This of course relies on the subjective position of Gromala and runs parallel to her experience of being awake during surgery, a sort of disembodied embodiment. Being immersed within the work conceptually situates Gromala as a living Matryoshka¹⁰ doll.

This is where Yacov Sharir’s experience of the work becomes particularly complex due to the relocation of his own sensorium into a vast virtual body structure (conveying the perception of a near-infinite space in which to move), while his physical body is constrained by tracking devices (the HMD and DataGlove) that hinder his movements. “I lost the sense of which environment my body exists in. This problematizes my experience since the sense of being grounded is usually primary to a dancer’s experience” [Fig 40-41] (Gromala & Sharir, 1996: 284).

In the passage quoted earlier, Heim suggested that the “tunnel vision” of the HMD is conducive to perception, but not apperception; that it “strips away self-awareness” (Heim, 1998: 101). While this may be the general rule of thumb, it certainly doesn’t apply to Sharir’s experience. Continuously confronted with the mirrored image of himself dancing, he describes how he becomes very much aware of the external presence of his physical body:

Within the architecture of this torso, I also find digitised images of myself dancing, again distributing and multiplying my own body and experience. This mirror effect, this dancing a duet with myself provokes a heightened anxiety caused by the doubling of my own body image (Gromala & Sharir, 1996: 284).

Perhaps this paradox of the “solo duet” is a functional example of what Gibson meant when he referred to cyberspace as an “infinite cage” in *Mona Lisa Overdrive* (1988:49); Sharir locked in a feedback loop with his virtual self, a loop continuously opening out upon itself like Klein’s bottle.

There are further parallels to Sacks’s *Disembodied Lady* here in how Christina learns to work around her affliction. Deducing that proprioception is akin to being the “eyes of the body” and that lacking it must by implication render the body “blind” (Sacks, 1985: 47), Christina learns to compensate for the body’s lack of awareness of itself through her sense of sight. She develops the ability to move through the use of her eyes to register the location of her body’s constituent external parts, although she “collapsed in a helpless heap the

10 Wooden Russian dolls of decreasing size that are placed inside of each other.

moment that she closed them” (Sacks, 1985: 48). The difference for Sharir is that rather than viewing his body in the first person like Christina, he was seeing it from a third person perspective, creating a separation akin to that of the mannequin in *ConFiguring the CAVE*, albeit with the recognition of the body as being his own.

Char Davies - *Osmose* and *Ephémère*

Char Davies’ *Osmose* (1995) and *Ephémère* (1998) incorporate notions of proprioception in an entirely different sense. Arguably the two most influential immersive virtual reality artworks to date, they have “received more attention in the international discussion of media art than perhaps any other contemporary work” (Grau, 2003: 193). Using HMD technology and a custom-designed vest fitted with breathing and balance sensors based on scuba diving equipment, the works locate a solitary immersant inside a vast virtual “simulacrum of nature” (Grau, 2003: 193). The visual elements within the work are ethereal and “deliberately watery and out-of-focus” (Ippolito, 2002: 497). This visual approach is heavily influenced by Davies’ own physical body. As a result of her eyes being “extremely myopic” when uncorrected by prescription lenses, “all semblance of hard edges, all sense of solid-surfaced separate objects” within her vision “[dissolve] into an ambiguous enveloping spatiality of soft, semi-transparent intermingling volumes of varying hues and luminosities” (Davies, 2004: 74)¹¹ [Fig 45].

Centred on a large pond environment with a tree “growing” next to it [Fig 44], *Osmose* is comprised of close to a dozen realms. The immersant first begins in a Cartesian grid [Fig 43], learning to orientate himself/herself within the work’s unique motion tracking system (to be discussed momentarily) before he or she can explore the world freely. Navigating upwards through the clouds leads to a realm made up of text, “excerpts of writing on perception, space, nature, the body and technology by poets and philosophers such as Rainer Marais Rilke, Gaston Bachelard, and Merleau-Ponty” (Davies, 2004: 92-93). Moving downwards takes the viewer through the subterranean underbelly of the pond clearing, surrounded first by root structures [Fig 46], and eventually the computer code that underlies the work¹².

Like *Virtual Bodies*, *Ephémère* also explores notions of the interior body as traversable terrain, although here it is with the intention of drawing parallels between exterior structures within nature and the interior body. Where *Osmose* is a timeless, contemplative space, *Ephémère* is eternally in a state of flux, its environment constantly shifting between night and day and the four seasons. *Osmose* is centred on a still pond, whereas *Ephémère* has a rapidly flowing stream that is the central conjoining motif in the work, flowing through all three of the main environments (a forest, the subterranean undergrowth and finally the interior body), and progressively shifting from water into blood [Fig 49-50]. There is an explicit link between the two works in this respect; in place of *Osmose*’s realm of code, *Ephémère* has flowing blood vessels and DNA double-helices, drawing parallels between the underlying structures of the natural and technological realms.

Particularly significant about the technical components of Davies’ works are the means by which they engage with the HMD technology. As mentioned earlier, the HMD is most closely associated with the notion of disembodiment; of dislocating the immersant’s sensory perception entirely from the physical realm and reconstructing all facets of the new environment in which the immersant finds himself/herself. Davies’ particular

11 See: (Davies, 2004: 69-104.) for a full discussion of the influence of Davies’ myopia on her art production; from her early work as a painter through until her later immersive virtual reality works.

12 Floating around within this realm is a spectre of *Placeholder*; much of the enormous programming code that John Harrison wrote for *Osmose* was adapted from the custom software that he had already written for Laurel and Strickland’s work (Grau, 2003: 196).



Fig 42. The custom HMD that immersants don for Char Davies' *Osmose* (1995) and *Ephémère* (1998).



Fig 43. The Cartesian grid environment that immersants begin their experience of Char Davies *Osmose* (1995) inside.

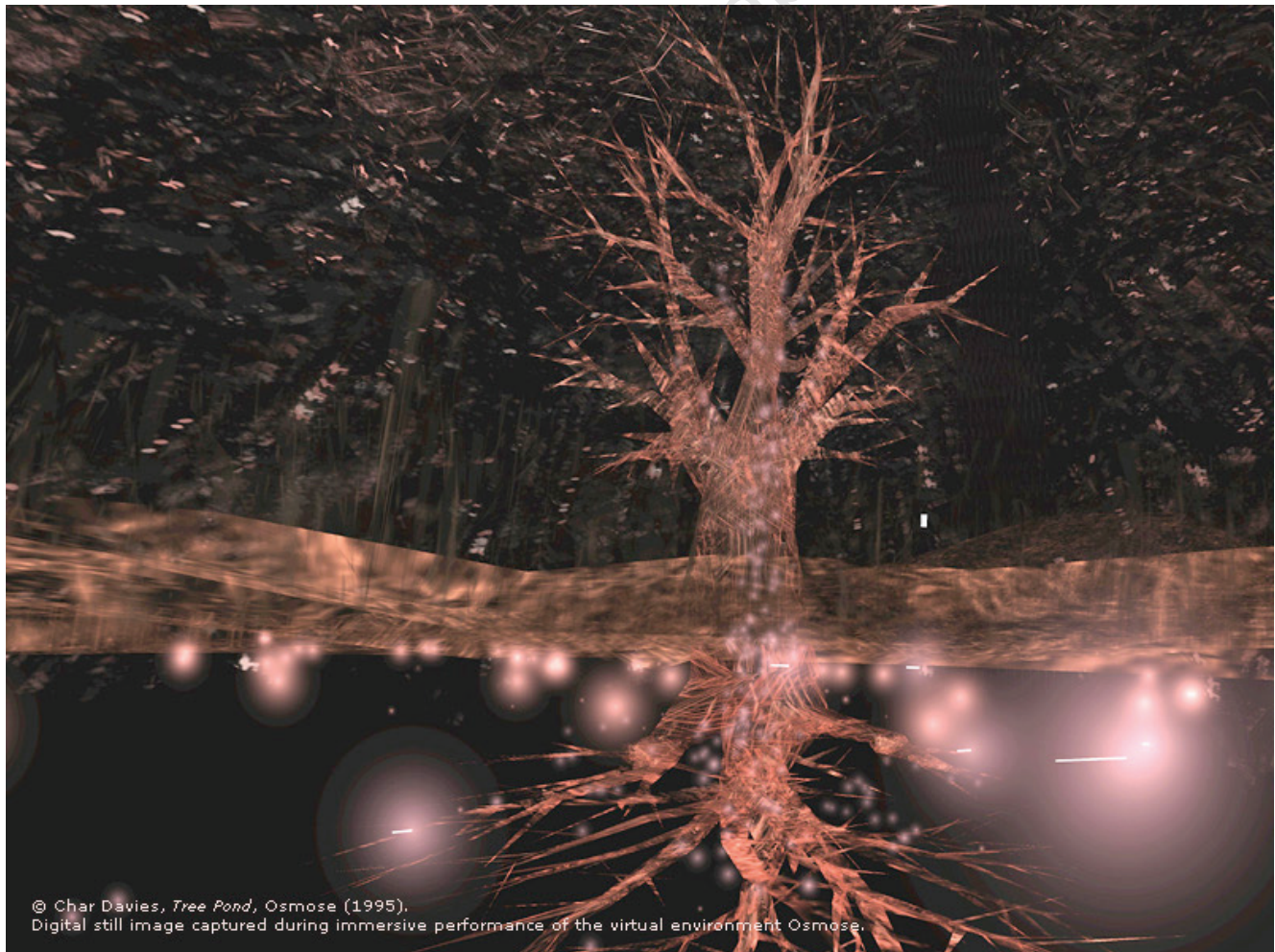


Fig 44. Char Davies *Osmose* (1995).

skill lies in modelling the tracking hardware that facilitates the immersant's movement through *Osmose* and *Ephémère's* worlds on scuba diving equipment [Fig 42].

By using the scuba diving metaphor¹³, Davies' works very astutely manage to enact a CAVE-like effect within the HMD, keeping the immersant firmly within their own body and aware of its necessity in traversing the virtual environments of the works. Simultaneously, the relation to scuba gear circumvents the cumbersome, "intrusive" - to borrow a phrase from Sandin, DeFanti & Cruz-Neira (1993: 271) - effect of the HMD by incorporating this into the works themselves.

To elaborate, in most HMD scenarios there is little reason as to why anyone within the virtual world would be wearing large, weighty equipment around their heads. The physicality of the HMD acts as a constant reminder that there is something cumbersome afflicting the physical body, which has no specific causal relation to the world that the virtual reality work is attempting to immerse the viewer in. Whether it is the explorer in Jenny Holzer's ravaged *World Two* (1993) or the assumed animals in Laurel and Strickland's *Placeholder*, the onset of what I shall term "HMD fatigue" is retrograde to the intentions of immersion.

In contrast, one dons scuba gear with the intention of being quite literally immersed in a 360° enveloping environment. The tracking hardware thus supports the immersant-to-be's expectations, and the physical body is therefore intrinsically tied to the experience of the work at all times. The result is extremely effective, as Margaret Morse testifies:

Davies herself and many visitors to the piece have had profound experiences related to the worlds themselves and the use of breath and balance to exploit them. I, however, experienced several of the worlds in the piece as an occasion for panic. Like many asthmatics, being underwater, makes me deeply and instantly afraid. Evidently, even when the water is symbolic, I experience it viscerally as water and as everything smothering that water means to me (1998: 208- 209).

Because Morse's testimony supports both the assertion that Davies' approach is startlingly effective and Michael Heim's declaration that "our bodies carry knowledge accumulated through years of unconscious experiment" (1998: 30), this further complicates any suggestion of disembodiment. In this instance, Heim's declaration reinforces the idea that Davies' work incorporates an embodied HMD experience. Recall Jaron Lanier's earlier-quoted assertion of the ability of individuals to adjust to the virtual inhabitation of a completely different sort of body when immersed in virtual reality. That the expectations accumulated from Morse's lived experience as an asthmatic informed her reactions to Davies' virtual world, enforces the notion that she was (psychologically at least) experiencing *Osmose* very much within her own body.

As a criticism of the work, Graham Coulter-Smith suggests that "*Osmose* is not interactive" (2006), and implies that it functions more as a purely sensory experience. "*Osmose* is not *critical* art, which does not mean it is not art, it simply means that it is not *deconstructive* art" (Coulter-Smith, 2006) [original emphasis]. That Coulter-Smith then cites Maurice Benayoun's harrowing CAVE-based theatre of war *World Skin* (1998) as an example of effective, critical immersive virtual reality art has the unfortunate consequence of drawing parallels between the above quotation and some of Kant's more "questionable" assertions regarding sex and notions of beauty and the sublime: "The fair sex has just as much understanding as the male, only it is a *beautiful understanding*, while ours should be a *deeper understanding*, which is an expression that means the same thing as the sublime" (Kant, 2011: 36) [original emphasis].

13 One previously suggested by Meredith Bricken (1991: 364).



Fig 45. Char Davies *Still Life & Glasses* (1981). Chalk on paper. Earlier work by Davies demonstrating the effects of her myopia on her vision.



© Char Davies, *Subterranean Earth*, *Osmose* (1995).
Digital still image captured during immersive performance of the virtual environment *Osmose*.

Fig 46. Char Davies *Osmose* (1995).

Nonetheless, to suggest that Davies' work lacks interactivity is to place it at odds with the working definition of virtual reality that is incorporated in this thesis (interactive immersion within a computer-generated virtual environment). Within both *Osmose* and *Ephémère*, the viewer's presence in the virtual world is incidental, which is to say that the immersant has no effect on what occurs within the world. The exploration of this world, however, is non-linear, and the immersant is free to move about in whichever manner he or she chooses.

Support for Davies' work lies in Michael Heim's summation (mentioned in Chapter One) of the "three i's of virtual reality": immersion, interactivity and information intensity (1998: 7). "Interactivity" refers to "the computer's lightning ability to change the scene's point-of-view as fast as the human organism can alter its physical position and perspective", while "information intensity" suggests "constantly updated information that supports immersion and interactivity" and "special qualities like telepresence and artificial entities" (1998: 7). Telepresence, as in the immersive sense of being present within a technologically mediated environment, is certainly a feature of the work, enhanced (as described) by the specific tracking hardware of the work. Heim's definition of information intensity (and therefore interaction) is thus incorporated into the work. Davies herself refers to this facet of her work as "kinaesthetic interaction" (1998: 298).

Finally, Coulter-Smith's¹⁴ argument that *Osmose* lacks criticality can be called into question if it is taken into account that both *Osmose* and *Ephémère* insist on an embodied experience of immersive virtual reality that marks a critical engagement with notions of the body and the perceived willingness to abandon it. As Davies suggests, "*Osmose* as an artwork seeks to heal the rational Cartesian mind/body subject/object split which has shaped so many of our cultural values, especially towards nature" (quoted in Heim, 1998: 162).

While every other work discussed in this chapter facilitates the simultaneous immersion of multiple participants/viewers in some form or another, Davies' works explicitly require the individual to take a 15 minute session immersed in solitude. This is extended furthermore into what Margaret Morse refers to as the "just for me"-ness of the picturesque or sublime view (1996:214), shifting the reading of *Osmose* and *Ephémère* from the realm of the beautiful (as applied in Coulter-Smith's reading of them) to that of the sublime.

There is certainly a strong sense of the sublime in Oliver Grau's description of the work:

Like a diver, *solitary* and weightless, the interactor first glides out of a grid of Cartesian coordinates into the virtual scenarios: a *boundless oceanic abyss*, shimmering swathes of opaque clouds, passing softly glowing dewdrops and translucent swarms of computer-generated insects, *into the dense undergrowth of a dark forest* (Grau, 2003: 193)[emphasis added].

Particularly if we compare it to Kant's description of the natural sublime as:

lofty oaks and *lonely shadows* in sacred groves... by the quiet calm of a summer evening, when the *flickering light of the stars* breaks through *the umber shadows of the night* and the lonely moon rises into view (2011: 16)[emphasis added].

Yet within both *Osmose* and *Ephémère*, these notions of the sublime and the beautiful are never static and remain in constant flux. As a somewhat literal example, where Kant suggests that the night is sublime and the day is beautiful (2011: 16), the virtual environment of *Ephémère* is in a constantly shifting permutation between the two [Fig 48]. Frances Ferguson extends this analogy: "We love what is beautiful for submitting to us, for being less than we are; we react with dread and awe to what is sublime because of its appearing greater than we are,

¹⁴ It may seem as though Coulter-Smith is being made into a paper tiger here, but the concerns of his argument have been critiqued at length because they lay the groundwork for a larger discussion of critical distance in immersive virtual reality that will take place in Chapter Three.



Fig 47. Installation view of Char Davies *Osmose* (1995).



Fig 48. Char Davies *Ephémère* (1998).

for being *more*, and making us acknowledge its power” (1992: 8-9).

Davies details a shift between these two states in describing a pattern of behaviour that emerged among participants during immersion:

After becoming accustomed to the interface of breath and balance, most people become intent on “doing”, traveling around to see as much as possible in what appears to be an extension of everyday goal-oriented, action behaviour. After ten minutes or so, however, most undergo a change: their facial expressions and body gestures loosen, and instead of rushing, they slow down, mesmerized within the space, creating a very unusual experiential context (Davies, 1998: 297).

Here there is a very clear shift from Ferguson’s description of the submissive beautiful to the awesome sublime. There can be few more concise descriptions of “making us acknowledge the sublime’s power” than Davies’ account of a participant declaring that “they were no longer afraid of dying” upon completing a session (1998: 297). A similar pattern of behaviour is observed in *Ephémère*; the immersants ultimately submit to the work, “passively submerging [themselves] in the swiftly flowing and noisy stream/underground river/artery” (Davies, 2004: 95). This is all intrinsically linked to an intentionally embodied immersive experience.

The initial section of Davies’ description concerning “action behaviour” corresponds with Allucquère Rosanne Stone’s suggestion that “Cyberspace is surely also a concretization of the psychoanalytically framed desire of the male to achieve the ‘kinesthetically exciting, dizzying sense’ of freedom” (1991: 107). Stone argues that

in psychoanalytic terms, for the young male, unlimited power first suggests the mother. The experience of unlimited power is both gendered and [...] fraught with the need for control [...] It seems to be the engagement of the adolescent male within humans of both sexes which is responsible for the seductiveness of the cybernetic mode (1991: 108).

Stone’s point is that the “seductive” appeal of cyberspace lies in the promise of “unlimited power”, the shift from being the controlled to the controller. Yet, as described with reference to Davies’ work, this seductive realm that purports to encompass the triumph of the rational mind over the material body is able to shift into the sublime, disempowering Stone’s unsexed adolescent male and returning it back to physical reality.

Here we touch upon the realm of Donna Haraway’s cyborg when she asserts that “Perhaps, ironically, we can learn from our fusions with animals and machines how not to be Man, the embodiment of Western logos” (1991: 173). The connections to the beautiful and sublime were drawn with this in mind to illustrate some of the complexities that emerge from this hybrid state.

From the discussion, it becomes very apparent that there are no neat splits in terms of mind/body and disembodied/embodied immersion, only permeation and flux. Immersion within the artworks described takes the immersant through mutable experiences that are liquid and hybrid. This is enacted in various ways, from the option to shift between a variety of “smart costumes” in *Placeholder* to *Virtual Bodies*’ translation of Gromala’s own physical body into virtual terrain, *Osmose* and *Ephémère*’s embodied sense of full-immersion within a virtual environment, and the mannequin as prosthetic body for interacting with a virtual environment in *ConFiguring the CAVE*.

Being immersed in virtual environments on an experiential level has the ability to either displace or reinforce the sense of being within one’s own physical body. Hayles and Stone assert that there is always a body supporting the mind that is immersed in virtual reality, and as Lanier informs, this mind can be capable of assuming control of virtual bodies that are very different to its physical human one. Thus there is a sort of hybridity inherent in stating that “the body marks one kind of presence; the point of view, or pov, that constructs the user’s position



Fig 49. Char Davies *Ephémère* (1998).

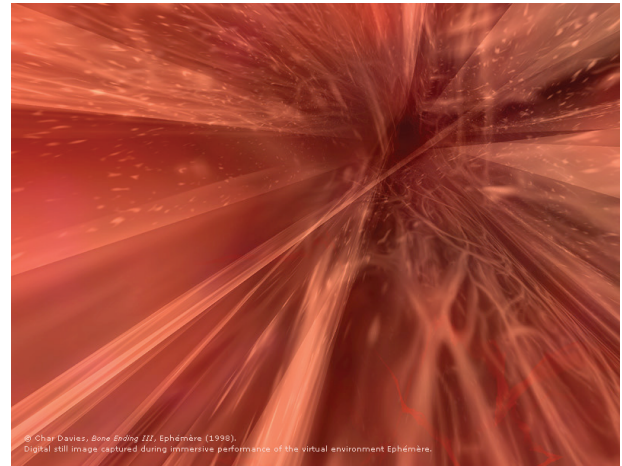


Fig 50. Char Davies *Ephémère* (1998).

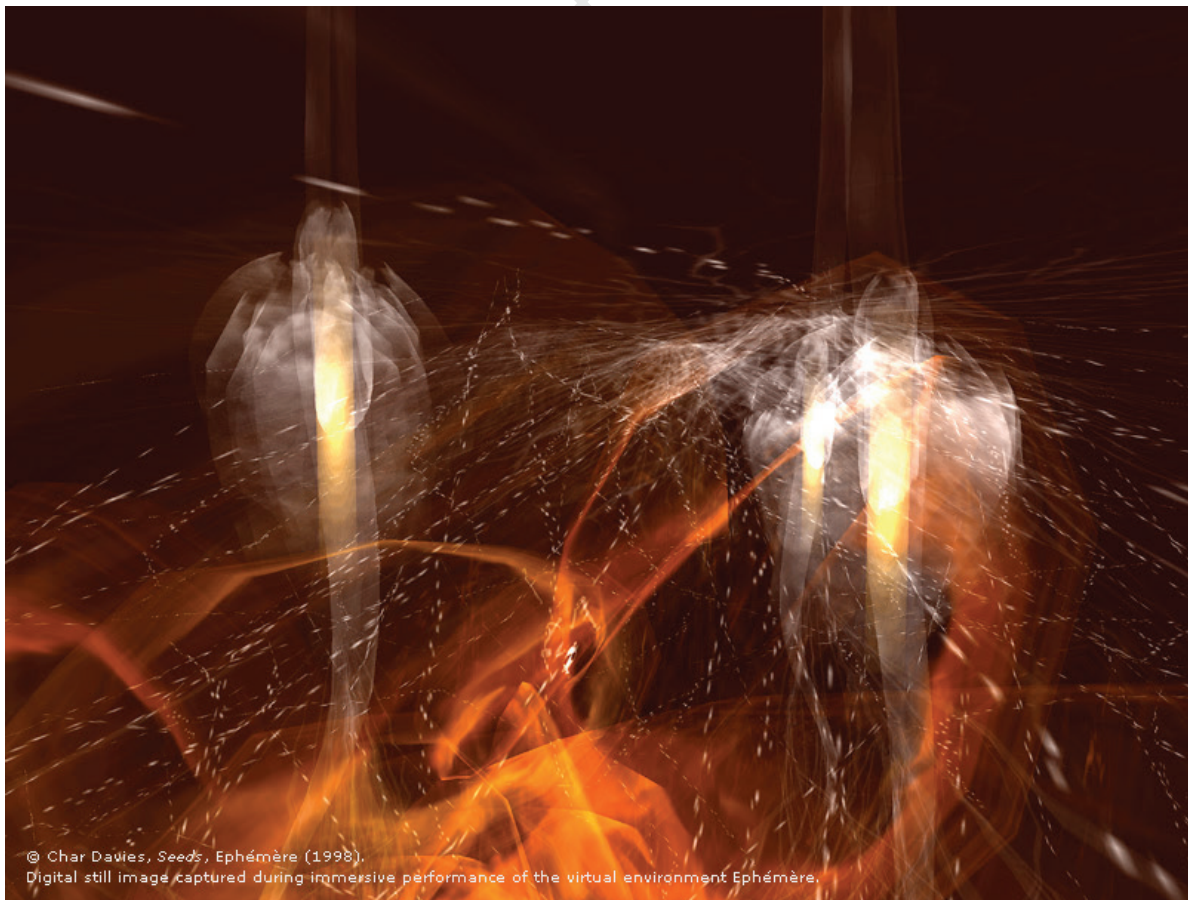


Fig 51. Char Davies *Ephémère* (1998).

within the simulation marks another” (Hayles, 1996: 14).

Despite this, all of the works ultimately bring the immersant back to the physical body, much like Gibson’s console cowboys jacking-in to the cyberspace matrix. Until something akin to Raymond Kurzweil’s “singularity” of “human consciousness housed in technology” (Grossman, 2011) becomes a reality, if indeed this is even possible, disembodiment proper will remain in the realm of science fiction from whence it emerged.

Even then, Gibson has suggested in retrospect that when he coined the cyberspace term by “[assembling]... cyberspace from small and readily available components of language”, it “preceded any concept whatever. Slick and hollow- awaiting received meaning” (Gibson, 1991: 27). That his later books evidence an increased encroachment of the body into his “bodiless exultation of cyberspace” suggests that even the fictional accounts are not immune to permeation once “other words accrete in the interstices” of “folded words” (Gibson, 1991: 27).

University of Cape Town

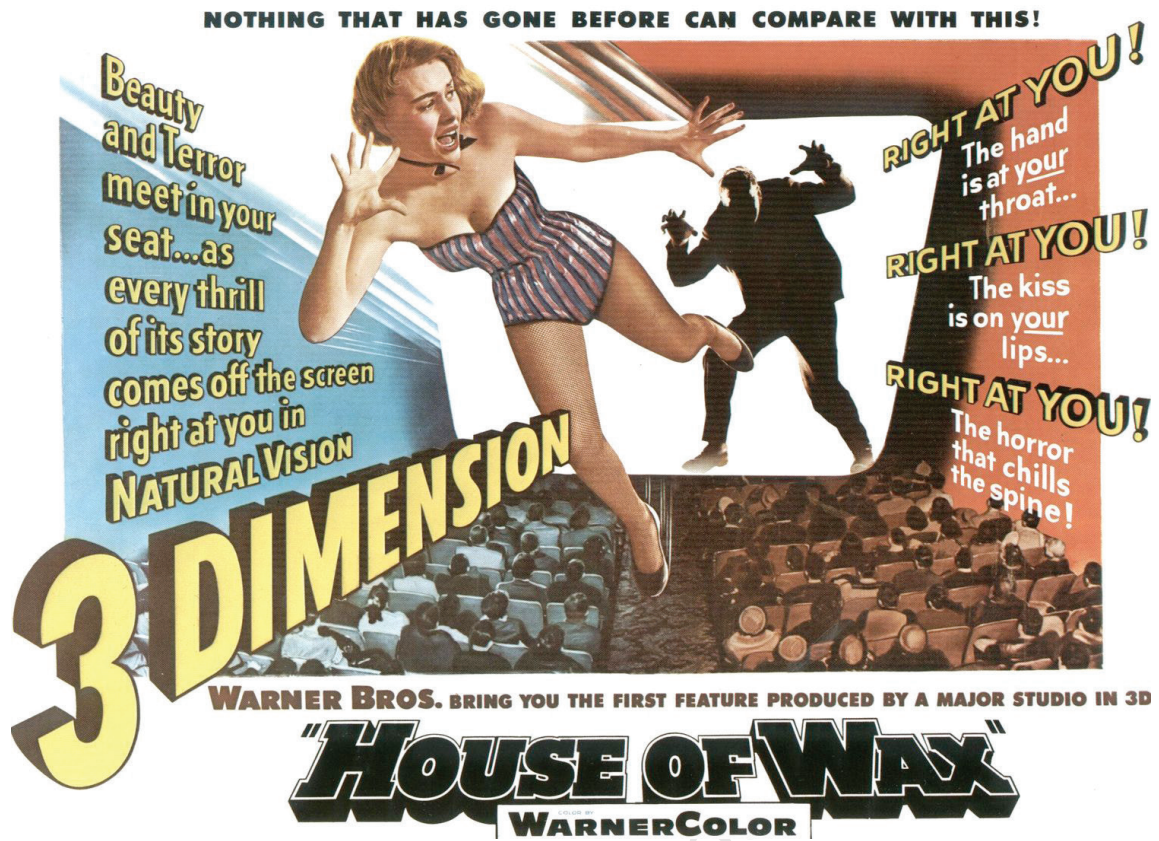


Fig 52. Theatrical poster for André de Toth's film *House of Wax* (1953).



Fig 53. Theatrical poster for Arch Oboler's *Bwana Devil* (1952).

CHAPTER THREE

FUTURE CINEMA: NARRATIVE, INTERACTIVITY AND AGENCY
IN IMMERSIVE VIRTUAL REALITY INSTALLATION

Every astounding scene in the story comes as close as the person next to you...
 And *You* are a part of the living drama that takes you into the screaming terror of the "House of Wax".
 A chamber of horrors... And *You* are engulfed in its mysteries!
 ...1001 high tension thrills in vivid WarnerColor come off the screen... *Right at you!* In exciting third
 dimension.
 -Excerpts from the theatrical trailer for *House of Wax* (1953) [original emphasis]

The history of cinema is peppered with numerous attempts at making the cinematic experience more immersive. The more explicit of these are the variants of 3D that first emerged in Harry K. Fairall's *The Power of Love* (1922), and have since reappeared in clusters in the 1950s, 1980s, and in the first decades of the new millennium. The opening quotation is demonstrative of the kinds of enhancements that the marketing and poster taglines alleged 3D to add to the cinematic experience. "*You* are a part of the living drama", "*you* are engulfed in the mysteries of the chamber of horrors", and "1001 high tension thrills come off the screen and right at *you*" suggest that the viewer becomes central to the film; everything is directed at *you* [Fig 52-53]. While this is obviously a feature of any film (who else could the film be directed at?), the idea is that the experience of watching the film in 3D is more convincing to the viewer; that he/she is in the thick of it, and completely immersed in the events and locations of the film.

While this impulse took on many forms and has seen somewhat of a resurgence recently with the current widespread use of RealD 3D in commercial cinemas, this chapter is not concerned with documenting all of these manifestations as this has been comprehensively covered elsewhere.¹ However, the idea of "expanding cinema" (to use Gene Youngblood's phrase) through enhancing its immersive features has proven to be a conceptual starting block for many immersive virtual reality artworks. This attraction towards the idea of film as immersive spectacle was arguably birthed alongside the infamous moment in film lore where startled viewers allegedly fled screaming from the oncoming train in August and Louis Lumière's 1897 film *Arrivée d'un train en gare le ciotat* [Arrival of the Train].²

Of course the cinema viewer (in the conventional sense) will never have any influence on the proceedings in a film. This contradiction has led Toni Dove to suggest that film is in fact a disembodied medium; that the viewer is a phantasmic presence within the film's environment but has no capacity to alter or affect it: "In a traditional film the position of viewer (voyeur) is physically passive - the process of spectatorship is physically still. The film becomes the eyes and point of view of the viewer and the body is left behind or forgotten" (2002: 210).

A similar point could be argued with respect to theatre, but while the cinema screen is a fixed, unalterable barrier, the "screen" in theatre is one that is enforced by social etiquette. In other words, should an audience

1 See: Zone (2012) in particular, as well as Grau (2003: 140- 191), Huhtamo (2003: 466- 473), Coulter-Smith (2006), amongst others.

2 At the least this marks the first instance of marketing overstating and hyping up the immersive effects of a new technology. Martin Loiperdinger, for instance, has suggested that the Lumière "myth" is a "generally agreed upon rumour" and "not hard to refute" (2004: 91- 92).



Fig 54. J.R. Eyerman's cover of the 15 December 1952 issue of *Life* magazine which depicted a 3D glasses-wearing audience viewing Arch Oboler's *Bwana Devil* (1952).

member be compelled, they could hurl a shoe at the onstage proceedings and concuss Macbeth in the crucial moments before entering Duncan's chambers. This would severely affect the progress of the play or more likely halt it completely. One could sabotage the projector and achieve the same effect with a film, but the difference is that a particularly wily cast could take it upon themselves to improvise a solution to an unexpected turn of events in the unfolding of a play's narrative until the theatrical train is returned to its tracks.

It is the mutual understanding and respect between actor and spectator in the theatre ritual that keeps the two separate. Here the *faux* audacity inherent in the gesture of tickling the performing string quartet in Thomas Dolby's work for the 'Virtual Reality: An Emerging Medium' exhibition becomes more apparent than it did in the first chapter.

There are obviously exceptions to this audience/actor dichotomy with the theatre being infinitely more conducive than film to improvisation and mutability as it is performed in real time. These exceptions range from improvisational theatre sports to Augusto Boal's, "Theatre of the Oppressed" (Frasca, 2004: 88), and also include theatrical productions aimed at children where the audience is required to participate (clap, make noise) at specific points in order to further the narrative³. Nonetheless, the inclusion of audience participation in the theatrical context is, for the most part, still treated as a novelty and is the exception to the rule of passively-viewed theatrical productions with a fixed, defined narrative.

A striving for audience participation and mutability is evident in art movements such as Action Art, Alan Kaprow's Happenings, and many of the artists who Nicholas Bourriaud described in *Relational Aesthetics* as working in "interactive, user-friendly and relational concepts" during the 1990s (2002:8). Intrinsic to these movements in varying degrees is an increased sense of audience participation, an alleviation of the distinctions between the audience and the performers/actors, and an increasing mutability of narrative form. Throughout this thesis, the working definition of virtual reality has been defined in terms of immersion and interactivity. The works under discussion in this chapter look at the implications of increasing immersion and viewer participation through interaction within a narrative or performative virtual environment.

Interaction within immersive, computer-generated environments does mark a different sort of participation than the cited art movements, as outlined by Annika Blunck:

In the past, as now, spectators have become actors; yet now they are absorbed by immersion into exactly that artificial world from which Action Art and Happening wanted to free them. While narration, storytelling apparatus and narrator were separated in the 1960s in order to be critically examined, the programme of the 1990s aimed at synthesising these three aspects (Blunck, 2002: 55).

While immersion and interactivity are the two requisite terms, they are not mutually inclusive. In part, Blunck's assertion seems to reiterate the distrust of immersion's ability to facilitate critical distance. In the previous chapter, this was exactly what Graham Coulter-Smith suggested in arguing why Char Davies's *Osmose* did not qualify as critical art. In his view, *Osmose* was undoubtedly an immersive work, but not an interactive one (Coulter-Smith, 2006).

Assume for a moment that a 3D film was fully immersive and the cinema-goer was entirely convinced of their presence in the narrative. Dove's assertion of cinema as a disembodied medium would still persist due to the inability of the viewer to change anything in the onscreen narrative, an experience that would surely become frustrating: "The more realised the immersive environment, the more active we want to be within it" (Murray,

3 See: The "Peter Pan incident" discussed in (Murray, 1997: 100-101).

1997: 126). This implies two things: first that interactivity is going to be a crucial term in this chapter (if we treat it as offering a cure for the itch prompted by this desire for increased activity); and secondly that at some point, 3D cinema as a passive medium will necessitate the instantiation of a glass ceiling, a *petit immersion*, if it doesn't wish to frustrate its viewers.

The cracks of this problem of passivity are already starting to emerge, as can unintentionally be seen in many of the interviews with notable filmmakers and technical experts in Adrian Pennington and Carolyn Giardina's book, *Exploring 3D: The New Grammar of Stereoscopic Filmmaking* (2012). Despite arguing in favour of the resurgence of stereoscopic cinema and suggesting that "this time around stereoscopy [may] grow to be as ubiquitous as two-dimensional imagery is today" (2012: 5), there is still an inherent tension that emerges during discussions around stereoscopic cinema and the framing constraints of the screen:

Stereo 3D comes closer to simulating human vision, but can only approximate our depth perception. Unlike other art forms which are created in space— notably sculpture and theatre— we cannot physically move our heads or bodies in stereo 3D to see around an object. Filmmakers must direct the way we perceive depth just as they are directing our view of a subject and of a scene by composition and focus (Pennington & Giardina, 2012: 5-6).

Thus stereoscopic cinema seems to be conceptually paradoxical. On the one hand, visual effects supervisor Joe Letteri⁴ suggests that with regards to the 3D choices in James Cameron's *Avatar* (2009): "The primary goal was to give you a sense of presence and of being there" (Pennington & Giardina 2012: 6). On the other hand, the filmmakers were forced to continually incorporate visual cues to direct the viewers' gaze within the frame: "If the viewers are fishing around the screen not knowing where to look, it becomes uncomfortable. If they have to do it too much, the experience starts to fall apart" (Pennington & Giardina 2012: 6). In other words, the intention is for viewers to *feel* present within the cinematic world, but at the same time the experience starts to fall apart if they attempt to engage in any action that would go along with *being* present in the cinematic world that is confined to the frame of the screen.

While it is definitely more immersive than 2D cinema, 3D cinema does seem less like a "revolution" (as Dreamworks Animation CEO Jeffrey Katzenberg suggests in the book's introduction (Pennington & Giardina 2012: x)) and more like a baby step towards the greater project of fully-realised, active immersion. If the goal of this stereoscopic cinema "revolution" is to "dissolve the wall of the screen into an open window, drawing us into the film while releasing the characters into the theatre" (Katzenberg in Pennington & Giardina 2012: ix), then the inability of the viewer to shift their point of view or interact with the film in any way is always going to be somewhat of a thorn in its side.

Brenda Laurel refers to immersive virtual reality in which the viewer cannot interact as "passive VR", suggesting that this sort of immersion is "deeply wrong" and that "the illusion of reality (and therefore the invocation of the 'whole' human) depends on the ability to *act* within an environment" (1993: 207) [original emphasis]. Following Laurel's definition, it would appear that interactive virtual reality is defined by the ability of the immersant to act according to a set of circumstances presented in a virtual environment, therefore placing the appeal of interactivity in the realm of "agency", "When the things we do bring tangible results, we experience the second⁵ characteristic delight of electronic environments - the sense of agency" (Murray, 1997: 126).

The complexity of introducing the option of agency into a narrative is that the piece is then required to shift

⁴ Letteri received his fourth Academy Award for best visual effects for his work on *Avatar* (2009).

⁵ The first being immersion (Murray, 1998: 97- 125)

from a linear structure into one with a degree of open-endedness and choice. The implication of this is that the active viewer becomes a decision maker in terms of the directions that the work takes. During the 'Art After Virtual Reality' symposium that was attached to the Guggenheim's 'Virtual Reality' exhibition, Michael Govan (the moderator) asked Thomas Dolby whether he envisioned the viewer/listener participating in the music of the future by changing or manipulating the work that they were experiencing.

Dolby responded with:

I think it's going to be possible to interact more and more with the art that you enjoy, be it music, visual art or whatever. But this introduces a big issue for artists: to what extent is their job going to be to constrain the kind of experience that the viewer or the listener has? On one level, I'd love to leap into this and say that I want the viewer/listener to become totally in control of their experience. But then there's another voice that says to me, "No, you're the guy with the musical ears. You're the one who should be deciding the kinds of parameters that people move in" (Govan et al, 1994:55).

Stuart Moulthrop agreed, explaining that:

To the extent that I set myself up as an artist, I want to be in control of the texts that I write. I've written a hypertext⁶ that is an elaborate branching structure, but people say to me all the time, "Gosh, this is really pretty overdetermined when you get down there, isn't it?" At which point I want to come back and say, "Yeah, but I'm an artist, that's what I do" (Govan et al, 1994:55).

Embedded in both of these responses is a degree of distrust towards relinquishing control of the authorship of the work to the viewer; that it may be retrograde to the role of the artist. Of course it could be argued that this freeing of the work has been a feature of art (at least) since 1967 when Roland Barthes penned *Death of the Author* and suggested that: "The modern scriptor is born simultaneously with the text, is in no way equipped with a being preceding or exceeding the writing, is not the subject with the book as predicate" (145). However it is not entirely the same thing, as Barthes's proposition centres on the interpretation of a fixed work; it is the meaning that fluctuates.

Gonzalo Frasca's⁷ differentiation between representation, simulation and narrative is useful in highlighting this distinction, outlined in the following example:

A photograph of a plane will tell us information about its shape, and colour, but it will not fly or crash[...] a film about a plane landing is a narrative: an observer could interpret it in different ways (ie "it's a normal landing" or "it's an emergency landing") but she cannot manipulate it and influence how the plane will land since film sequences are fixed and unalterable[...] The flight simulator allows the player to perform actions that will modify the behaviour of the system in a way that is similar to the behaviour of the actual plane (Frasca, 2003: 224).

For Frasca, representation pertains to a visual description of something while narrative is a structured series of representations that read as a sequence of events. To simulate is to "model a (source) system through a different system which maintains to somebody some of the benefits of the original system" (Frasca 2003: 223). Frasca suggests that simulation is an "alternative semiotic structure" and that "Even if simulations and narrative do share some common elements-character, settings, events- their mechanics are essentially different. More importantly, they also offer distinct rhetorical possibilities" (Frasca, 2003: 221-222).

6 *Victory Garden* (1991)

7 While Frasca is working within the conceptual framework of video game studies (what he terms "ludology"), he is nonetheless discussing the ways in which people deal with interactive agency in computer-generated environments. There is much overlap between the discussions and therefore I don't view the inclusion of his arguments as being problematic.

To a large extent, all of the issues described only really become problematic within the context of an absurdly open work, one that is almost entirely devoid of prescribed objectives. This is far removed from what is being discussed here. If indeed it is even possible within a virtual context, then it is far from where virtual reality is at present. Rather than to create something linearly fixed, the artist's job becomes to create a "system/context in which the recipient/interactor constructs the object of his/her experience as well as its meaning" (Kluszczyński, 2007: 221).

"How can people participate as agents within representational contexts?" (Laurel, 1993: 21) Surely the solution is to act within the constraints put forward by the artist. For all of the insecurities surrounding co-authoring, the author of the work does not collaborate with the viewer on the components that form the experience of the work. The collaborative aspect lies in the order, weighting and meaning derived through interaction with these components:

The interactor is not the author of the digital narrative although the interactor can experience one of the most exciting aspects of artistic creation– the thrill of exerting power over enticing and plastic materials. *This is not authorship but agency* (Murray, 1997: 153) [emphasis added].

Nicole Stenger - *Angels*

Nicole Stenger's *Angels* (1989-1992), the self-proclaimed first immersive virtual reality movie, is a sound stepping stone to test this hypothesis of immersant as agent. The work was produced in collaboration with notable virtual reality luminaries, Jaron Lanier and Tom Furness, with music composed by Diane Thome. Functioning via a HMD and DataGlove [Fig 55], the immersants find themselves in a completely black environment, filled only with the hand avatar that responds to the DataGlove and a rotating carousel in the centre of a virtual space [Fig 56-57]. Inside this carousel are three hearts attached to ribbons that rise and fall in time with the carousel's rotation. This carousel acts as a gateway to the additional three realms in this "journey through a virtual paradise" (Thome, 1995: 31). Touching one of the three angel hearts determines the order in which the segments will appear [Fig 58].

The romantic language that Stenger uses to describe the work recalls the biblical myth of Eden, albeit an inversion of the story:

The doorway to 'Angels' is the gateway to paradise. Fruits are dangling there in the form of three pulsating hearts [...] You enter the revolving vestibule and, like a kid, touch one of the hearts. But you are not expelled from this paradise– on the contrary, you are invited to a new level (1994: 4).

Rather than facing divine wrath for reaching for the "fruit", the immersant is instead taken deeper into the work's interpretation of paradise; into a scene that corresponds with the heart that has been touched. These new scenes are themed around experiences of "bliss, loss and fusion" [Fig 59-61] (Stenger, 1998-2012).

Angels thus marks the point at which the concept of the viewer authoring his or her own experience was first implemented within an immersive virtual reality work, simply because the immersant is able to decide on the order in which the different environments of the work are experienced. Each of these environments is inhabited by an "angel" who responds to the immersant's body movements:

It is a short love story that then becomes your story, *now that you are included in the virtual movie*– now that you are the movie. The result of a dialogue between the angel's voice and your virtual body language provokes instant transformations in the environments that bring about a happy, sad or whimsical end to the story. Back to the gateway, you choose another heart, or you go back to your first love (Stenger, 1994: 4) [emphasis added].



Fig 55. Nicole Stenger with the HMD and DataGlove required for experiencing *Angels* (1989-1992).



Fig 56. Nicole Stenger's original model for the central carousel in *Angels* (1989-1992).



Fig 57. Nicole Stenger *Angels* (1989-1992). The Dataglove is represented in the virtual world as a floating hand.

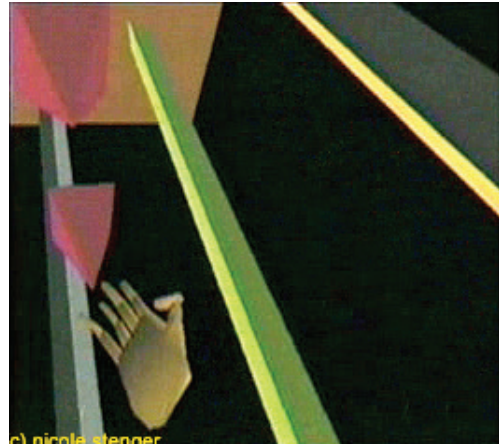


Fig 58. Nicole Stenger *Angels* (1989-1992). Touching one of the hearts opens a gateway to a different world

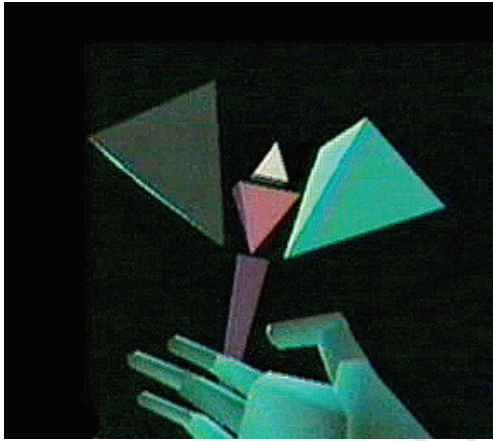


Fig 59. Nicole Stenger *Angels* (1989-1992). The "Loss" environment

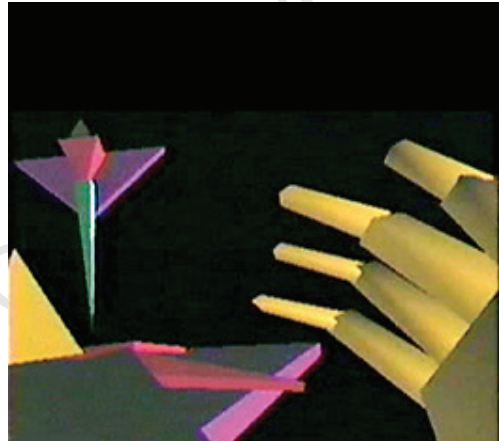


Fig 60. Nicole Stenger *Angels* (1989-1992). The "Bliss" environment

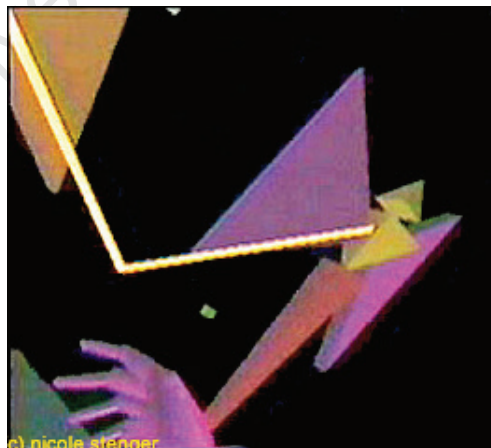


Fig 61. Nicole Stenger *Angels* (1989-1992). The "Fusion" environment.

The experience of the work could then be structured according to six different sequences (assuming that the viewer does not “go back to their first love” and repeat). Having said that, the level of interaction is very limited in the work, and “while the participant could alter the sequence of virtual environments, the particular images and music associated with each environment remain fixed” (Thome, 1995: 30). Looked at in terms of Frasca, *Angels* marks a more active variant of “narrative” in that the viewer can select the sequence of the component parts, even though these parts are still “fixed and unalterable”. The question is whether this is an example of genuine interaction or whether it is merely a process of shuffling.

Toni Dove and Michael Mackenzie – *Archeology of a Mother Tongue*

In a 1994 article for *Leonardo*, Toni Dove reflected on this question, lamenting what she referred to as the replacing of “intellectual challenge with multiple choice” (281). The article, titled *Theatre without Actors*, was an overview of Dove’s experiences while producing *Archeology of a Mother Tongue* (1993), an immersive virtual reality installation realised in collaboration with playwright Michael Mackenzie. It was produced as part of the ‘Art and Virtual Environments Project’ at the Banff Centre for the Arts. The suggestion in the article is that the “process of mapping– elaborate logic trees with all possible choices predetermined– seemed tedious and impractical and the concept of ‘choice’ seemed a deceptive fallacy” (Dove, 1994: 281).

Dove wished to emulate a perceived “shift in emphasis away from a central, linear story towards environmental immersion,” a shift that she considered to be exemplified by Ridley Scott’s 1982 film *Blade Runner* and William Gibson’s 1984 novel *Neuromancer* (Dove, 1994: 283). In both of these, she felt that, “the central storylines[...] are like props or coat hangers that support the real action: a narrative built on the environmental details of an imagined future[...] the main function of the narrative is to move us through the environment which tells the real story” (Dove, 1994: 283).

What is particularly interesting about *Archeology of a Mother Tongue* is the manner in which it models interactivity within a narrative environment. As mentioned, Dove viewed many so-called interactive works as working with a multiple choice system and was more interested in “engaging with options that have substantial ramifications” instead (Dove, 1994: 281). Corresponding with Michael Heim’s definition of interactivity as being changes within the virtual world in accordance with the immersant’s movements (Heim, 1998: 7), Dove and Mackenzie located their solution within the notion of response. In contrast to the cinematic cut, the “sensual continuum” of a responsive immersive environment “tends to diminish the linear impact of narrative flow in time and to open it up” (Dove, 1994: 283). Rather than letting the narrative be defined by a selective (and omissive) cinematic cut that is predetermined in terms of sequence, significance and framing, Dove and Mackenzie aimed to immerse the viewer in an environment that would be made significant through their interaction with it.

Archeology of a Mother Tongue responds to the viewer’s movement through the virtual environment. The things that the viewer prioritises or focuses on will be the things that respond to her or him. Consequently, there are aspects of the story that may not be encountered during the course of the experience. While the work is ultimately linearly structured, for the most part it does not necessarily appear that way due to its responsive nature. “For the visitor, the piece does not resolve whether it is offering the experience of a narrative or of the *act of narration*” (Morse, 1996: 221) [original emphasis].

Rather than making this experience of the work a hermetic one, the artists sought to “examine some of the social and cultural ramifications of a new and powerful medium” (Dove & Mackenzie, 1996: 276). The work was designed to be collectively viewed by an audience, with a single performer, the “driver”, able to interact with the work and navigate its virtual environments. This was achieved with a DataGlove for touching and grabbing



Fig 62. Toni Dove and Michael Mackenzie *Archeology of a Mother Tongue* (1993). Installation view of the driver immersant interacting with the work.

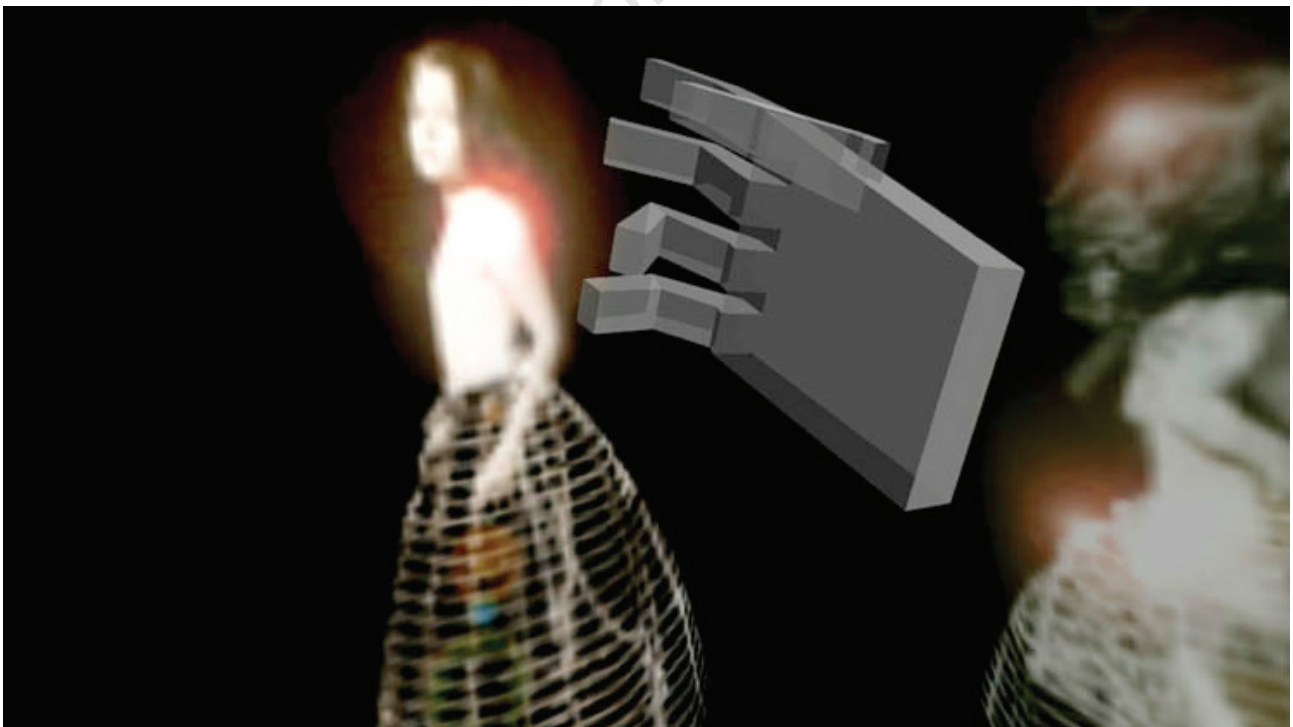


Fig 63. Toni Dove and Michael Mackenzie *Archeology of a Mother Tongue* (1993). View of the way in which the DataGlove is represented in the virtual environment.

objects within the work and a tracking device located within a plastic camera for changing the point of view [Fig 62].

The length of time required to complete a viewing of the piece became a swaying factor in many of the decisions made by Dove and Mackenzie in terms of the work's realisation. Morse found that it takes a viewer approximately 40 minutes to complete the work, although this figure fluctuates depending on "the curiosity of the driver and his or her skill in releasing narration from objects in each envelope" (1996: 223). The artists decided on a rear-projected screen (similar to the technology behind CAVE) in their display of the work as they felt that a HMD would be too cumbersome to be worn for that length of time and that "the resolution of the liquid crystal displays [were] still too low compared with the resolution of the graphics" (Dove, 1994: 285). A screen was also more conducive to viewing by a larger audience.

The plot takes the form of a "virtual reality murder mystery—part movie, part performance" (Dove, n.d.) and is a complex, surreal and often abstract journey through the minds of two characters, a coroner (voiced by Dove) and a pathologist (voiced by Mackenzie). These characters are encountered primarily through audible fragments of their thoughts, which are heard as the viewer navigates the work: "We know the characters of the coroner and of the pathologist largely as voices expressing different aspects of personhood" (Morse, 1998: 205).

The opening premise of the work is that the coroner is flying to a city in order to examine the body of a murdered young girl. This destination city was the coroner's birthplace, although when she was adopted as a child she was relocated and it now appears foreign and devoid of familiarity. Compounding this sense of alienation is an outbreak of diseases such as cholera and "dangerous microbes" that are plaguing the city and leading to its deterioration (Morse, 1996: 223). The investigation into the young girl's death runs parallel to the "pathologist's autopsy in the lab and the investigation of the coroner in the field" (Morse, 1996: 220). As the city rapidly falls apart, the child's body likewise decomposes at a rate that makes conclusive evidence from the autopsy increasingly unlikely.

Juxtaposition occurs between the search for answers within the city space and the interior body space. By drawing parallels between the body as a system and the city as organism, the autopsy becomes a "conceptual bridge between the physical body and the city" (Dove & Mackenzie, 1996: 276). These dual investigations are then mirrored by the immersed driver tasked with attempting to piece together the shattered narrative of the work by searching for clues in visual and audio shards scattered across the different virtual environments. The driver controls the depicted point of view through a tracking device housed within a miniature camera, casting the immersant as a sort of forensic photographer.

Dove and Mackenzie found that the 40-minute length made *Archeology* very computer resource-intensive, and so they divided the work into "envelopes that were sequentially loaded and unloaded into active memory" (1996: 278). Due to the time lapses created by this process, a series of laser disk video pieces were produced in order to bridge the space between each envelope. *Archeology of a Mother Tongue* is therefore structured according to three main immersive and interactive envelopes with immersive video disk sequences in the interstices.

A brief overview of the plot/structure:

The first envelope, "The Coroner Descends", assumes the form of a dream sequence as the coroner prepares for landing in the city. The city's form resembles a wireframe translation of a Piranesi prison drawing and is inhabited by fragments of the Coroner's memory (which contain snippets of audio narration) and animated figures which guide the driver further and further into the dream [Fig 64].



Fig 64. Toni Dove and Michael Mackenzie *Archeology of a Mother Tongue* (1993). The image depicts the first narrative envelope “The Coroner Descends”. In the background is a wirefram translation of a Piranesi prison drawing.

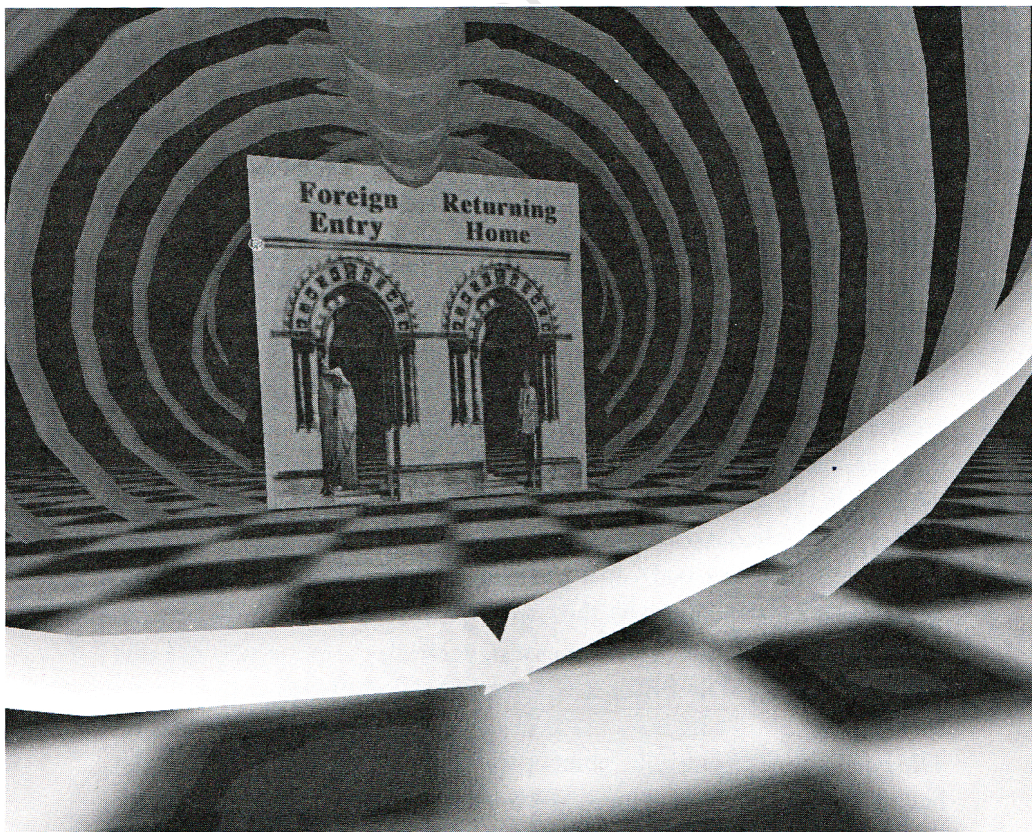


Fig 65. Toni Dove and Michael Mackenzie *Archeology of a Mother Tongue* (1993). The third environment entitled “The Terminus”.

Eventually the driver arrives at a “drain hole or vortex” (Morse, 1996: 223) which transports them to the second envelope, “The Coroner Arrives”.

In this envelope, charting the airplane’s entry into the city, the wireframe fuselage of the airplane morphs into an enormous human rib cage. Towards the end of the fuselage/rib cage is the third environment, “The Terminus”. Perhaps at odds with Dove’s aversion to multiple choice narratives, this envelope presents the driver with two doors marked “Foreign Entry” and “Returning Home” [Fig 65]. Selecting one leads to a narrative video sequence as well as a simulated power failure which causes the entire city to black out. “To push restart is to enter a different world” (Morse, 1996: 225); that of the Pathologist.

The fourth envelope, “The Pathologist”, places the driver in a dark void inhabited with a large skull [Fig 66]. This skull expands as the driver touches it, eventually engulfing them into a wireframe brain created from MRI scans and peppered with components of the Pathologist’s long term memory (Dove, 1994: 286). This wireframe memory transforms into an ambiguous entity that could either be a large city or an enormous corpse. “The fundamental situation is not unlike *Neuromancer*, in an even darker, bleaker mood [...] [the wireframe structure] is a condensation of a pathologist, a city, a machine, the dead girl, and an entity with agency that is the virtual landscape itself” (Morse, 1996: 225).

The work is as absurdly complicated as the above summary suggests, but this is an intentional move on the part of Dove and Mackenzie. Despite the apparent presence of structure, “the multiple narrative strands [...] do not necessarily connect” (Morse, 1996: 221), and the work remains largely ambiguous and abstract. That the different environments are rooted in the dreams and memories of two separate characters (not factoring in the patchy back-story of the deceased girl), implies that the viewer is navigating through a tangled web of subjectivities that will most likely never fully correlate. For Mackenzie and Dove, it was about creating an emotionally complex, engaging experience, supported by fragmented narrative rather than the converse.

As Mackenzie asserts:

The degree of success of the piece for me could be measured by the fact that participants, far from getting the experience they expected in VR, reported themselves disturbed or distressed by the experience. Good. That is an emotional journey; it worked (Dove & Mackenzie, 1996: 280).

The structure of *Archeology of a Mother Tongue* bears similarities to early 1990s proposals for an intersection between virtual reality and cinema known as “voomies”. Ken Pimental and Kevin Teixeira attribute this term to Jaron Lanier, and suggest that VPL Research was working on the technology (1993: 222). A voomie was proposed as a sort of immersive interactive cinematic experience, with a narrative direction that would be guided by two main actively immersed viewers. Their experience would then be passively (although still immersive sensorially) viewed by an accompanying audience (1993: 221-223).

The technology was described as follows:

Plans call for a room about the size of the small movie theaters now common in multiplex cinemas around the country [...] in the center of the theatre [...] two people would be fully equipped to enter a VR world. They would have sophisticated data gloves and goggles and the freedom to move about in the virtual world. Seated around them would be 36 spectators/participants (Pimental & Teixeira, 1993: 222).

At first glance, this model may appear undesirable in that (as with *Archeology*) there is a marked hierarchy amongst audience members. Considering that the two spectators who are fully immersed in the virtual world “will have a richer, more textured experience being fully immersed in the virtual world” (Pimental & Teixeira,



Fig 66. Toni Dove and Michael Mackenzie *Archeology of a Mother Tongue* (1993). The large skull in “The Pathologist”, the work’s forth and final narrative envelope.

1993: 222), the motivation for the other 36 individuals' involvement becomes unclear. If we consider, however, that this corresponds exactly with the model that was under discussion in both the previous chapter with regards to CAVE installations and the lead driver whose movements are tracked in *Archeology*, then it comes across as far less of an unprecedented proposition. There is also the spectatorship aspect of Char Davies's *Osmose* and *Ephémère*; watching both the solitary immersant in third person and their experience from a first person perspective on a screen.

The exhibition of these voomies would also more than likely be viewed in some form of public space. Consequently the idea becomes less preposterous as not everyone is equally inclined to take on such an exhibitionist role. Chris Hales made similar observations regarding his experiments with interactive film: "I frequently notice that certain individuals are too shy to interact in front of a crowd because they believe that they might make a mistake and embarrass themselves in front of others" (2002: 112). The idea that being cast as the lead immersant would be preferable to the majority due to the enhanced experience is therefore not a uniform assessment.

Another side to this dilemma is raised by Toni Dove, who observed that the driver/performer mode of presentation in *Archeology*, "had powerful theatrical aspects, but curtailed the experiential possibilities for one person in a virtual space because of the constraints of entertaining an audience" (1994: 285). In other words the primary immersant is also required to make the experience enjoyable for the passive spectators. This can potentially place constraints on the choices that one makes, particularly in a crossroads scenario where one route appeals to the primary immersant and another appeals to the majority of the spectators.

Brenda Laurel and Rachel Strickland– Placeholder

Brenda Laurel and Rachel Strickland's *Placeholder* (1993), discussed in relation to the immersed body in the previous chapter, was an example of what could literally be referred to as the viewer authoring his or her own virtual experience. *Placeholder* extended some of the ideas proposed in Laurel's acclaimed 1993 book, *Computers as Theatre*, and is interesting in the context of this discussion because it presented a scenario with no specific narrative or objectives: "*Placeholder* suggests that [virtual] reality technology can create a kind of stage set for adult improvisational play" (Murray, 1997: 61). *Placeholder* seems to fit snugly into Roger Caillois' notion of *paidia*, the "form of play present in early children (construction kits, games of make-believe, kinetic play)" (Frasca, 2003: 229-230). Frasca adds that while it is common to think that *paidia* has no rules, this is not the case; *paidia* simply does not incorporate rules that define a winner (2003: 230). The inverse of *paidia*, termed *ludus*, will surface later in this chapter.

Placeholder itself was very much based on improvisation and "play", and was developed with the help of the Precipice theatre group, an improvisational theatre troupe located in Banff that involves the community in theatrical projects focusing on environmental concerns. The work provides two immersants with a stage (the virtual reconstruction of three locations within Banff's natural landscape that are linked via portals [Fig 72]) and a selection of smart costumes. The immersants were required to use their imagination and make something of the experience, and in the process to interact with each other and the bodiless voice of a "goddess" [Fig 67].

The goddess was a third character within the virtual world who fulfilled the dual role of guide and "enriching dramatic interaction" (Laurel; Strickland & Tow, 1994). The "real" goddess was able to see each immersant's point of view within the virtual world on a screen as well as their physical bodies through a window [Fig 68], and was able to communicate either simultaneously or individually with the immersants. Due to time and resource constraints, the goddess's role as experienced in *Placeholder* was ultimately severely reduced from the artists'



Fig 67. Brenda Laurel and Rachel Strickland *Placeholder* (1993). Brenda Laurel performing the role of the goddess.



Fig 68. Brenda Laurel and Rachel Strickland *Placeholder* (1993). The goddess' view of the installation.

initial intentions:

We had planned for her to be able to cause many things to happen– change the weather, make rocks fall from the sky, send people through portals, and send her minion, the Mosquito, to pester anyone who displeased her. As with many other narrative elements, the schedule did not permit us to implement these plans. In the end, she simply spoke. (Laurel; Strickland & Tow, 1994).

Placeholder was an example of a work that cast the immersants in a role that they could not inhabit as themselves. In being cast in that role, the onus fell on the costumed immersant to improvise and make something of the experience. Due to the fact that the traits and representations of the animals were taken from their mythological uses in the local Banff area, the work could be described as a contemporary form of myth generation. While this idea of open improvisation is intriguing, it introduces the potential problem of what constitutes being “too open”.

A limitation with the structure of *Placeholder* is that there seemed to be a lack of consequences and rules. It is one thing to abolish rules that define a winner or loser, but it is another to revoke structures that bestow meaning and significance. Many of the rules in *Placeholder* pertain to what the viewer can or cannot do within the smart costume that they have selected. For instance, Crow can fly but is unable to enter water, while Fish can swim but cannot fly. Spider can climb walls while Snake has infrared vision to see clearly in the darkness of the cave.

Beyond that, the immersants were left to their own devices to explore the three locations of the virtual world (a cave, a waterfall in Johnstone Canyon, and a formation of hoodoos overlooking the Bow River) and to take advantage of the specific abilities of the smart costumes that they were assuming. The costumes could be switched throughout the session, confirming that the work was undoubtedly classifiable as *paidia*. As Frasca notes: “A child who is pretending to be a soldier follows the rules of behaving like a soldier and not as a doctor” (2003: 230).

Enjoyment of the work then depends on how effectively one is able to engage with it. It is along these lines that Erkki Huhtamo rejects Brenda Laurel’s “computers as theatre” metaphor outright, suggesting that “the theatre metaphor remains forced, reflecting perhaps Laurel’s own previous (*insider’s*) experience as an actress, but not that of any *regular theatre audiences*” (1996: 266) [emphasis added]. Huhtamo’s point is that while the system may be easily adaptable for the dramatically inclined, it may also be alienating to others. If the system was designed to work with seasoned actors, then it may have the unintentional effect of isolating those who were not.

These concerns were not quelled by Laurel noting that: “When *Placeholder* opened, the Precipice troupe were our first participants. Most of the actors were fascinated with the system and with VR. Their physical fluidity and improvisational skills made their interactions in the environments a joy to watch” (1994). The question then is whether the interactions of someone lacking in “physical fluidity and improvisational skills” are equally joyous to behold: “What is simple to achieve in real-world interactions between skilled actors is far from simple between untrained participants in a virtual environment” (Butterworth & Wyver, 2002: 96).

For a work so intrinsically structured on improvisation and imagination, a keen decision on the part of the designers then was to base the work around interaction between humans in a virtual environment. Implementing computer-controlled agents requires their actions to be arduously defined and programmed as the computer can only do what you tell it to do. People bring with them a lifetime of memories and lived experience that results in the ability to act in unpredictable ways and to adapt to a given situation.

As Janet H. Murray has pointed out, artificial intelligence programs tend to run on a “query system,” responding to a user by consulting a database to generate the appropriate response. “In order to make query systems succeed, one must limit their domain of expertise” (Murray, 1997: 217). Thus the goddess’s proposed mosquito could function as an effective computer-controlled agent because it would operate within a limited domain, i.e. to follow and pester the immersants. Trying to maintain dynamic conversation on the other hand, an action intrinsic to the success of the piece, becomes a different story: “If you can have a conversation with a simulated person presented by an AI [artificial intelligence] program, can you tell how far you’ve let your sense of personhood degrade in order to make the illusion work for you?” (Lanier, 2010: 32)

There are clearly benefits to having other humans sharing the virtual environment instead of computer-controlled agents. However Laurel also notes that: “There seems to be an upper limit (single digit) on the number of people who can interact meaningfully or pleasurably with one another (which is why little clusters form at cocktail parties)” (1994). The work then takes on the form of a dynamic, intimate exchange between the three people involved; the two immersants and the goddess. They are required to interact and respond to each other in a collaborative process. “The stories that people make up collaboratively in virtual environments are of a tribal nature; they may seem trite or derivative to an outsider, but they can be riveting and emotionally resonant for the participants” (Murray, 1997: 278).

Despite some of the concerns raised earlier about the structure of the work potentially being too open, the immersants were not left entirely to their own devices. Upon beginning a session, the immersants would find themselves in a cave environment with visible petroglyphs of each of the creatures. Once they moved sufficiently close to one of these petroglyphs, it would begin to talk about itself, describing its “powers, characteristics, and opinions of other Critters” (Laurel; Strickland & Tow, 1994). The smart costume was assumed when one’s head intersected with a petroglyph. In this way, immersants were provided with a framework of that creature’s specific personality traits, and prompted as to how it *might* act in response to the other creatures. The word “framework” is important as these are guidelines rather than rigidly imposed rules. If the immersant refused to assume a smart costume then they were invisible to the virtual world and denied access to the portals and were confined to the cave instead.

Brenda Laurel observed that the smart costumes did in fact prove effective in shifting the behaviour of those who assumed them:

The smart costumes immediately and strongly influenced participants’ behaviours. Their voices and body movements became more exaggerated and dramatic. Most people were “in character” the instant they realized that they had become embodied as a Critter. I suspect that the “masquerade” aspects of the smart costumes— replacing or obscuring one’s identity with an exotic persona, and also amplifying aspects of one’s own identity that are obscured by one’s ordinary persona— put people in a frame of mind that allowed them to play, often quite boldly and imaginatively (1994).

The engagement with the three virtual environments in *Placeholder* was enhanced by “Voiceholders” [Fig 70], scattered rocks with faces that participants could use to record messages. These messages were then permanently stored for future participants to play back. They could also be picked up using the specially designed hand interface that Laurel and Strickland refer to as a “grippee” [Fig 69], and moved anywhere within their respective environments. Much like the memory constructs in *Archeology*, these audio fragments become floating signifiers; their meaning shifted as they were moved around the environment and as the messages left by the immersants changed.

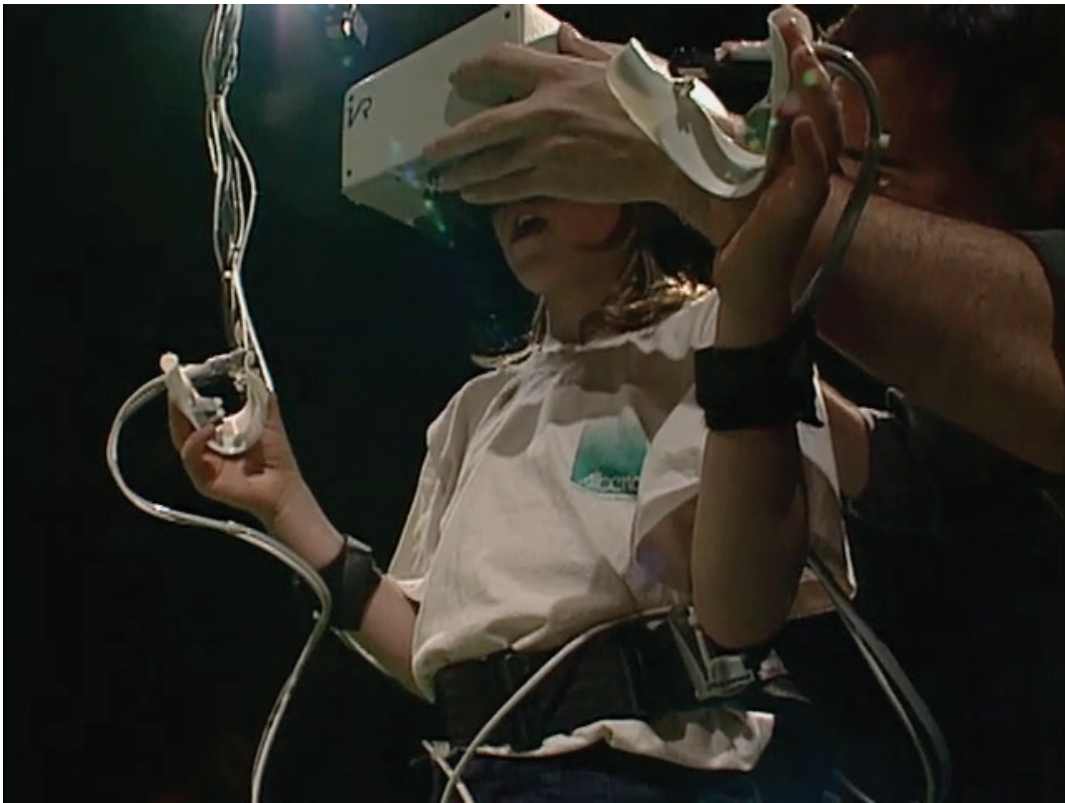


Fig 69. Brenda Laurel and Rachel Strickland *Placeholder* (1993). The HMD and grippees used to interact with the virtual environment.



Fig 70. Brenda Laurel and Rachel Strickland *Placeholder* (1993). Snake and spider interact with the Voiceholders in the cave environment.



Fig 71. Brenda Laurel and Rachel Strickland *Placeholder* (1993). The faces that reflect the different states of the Voiceholders. From left to right: empty, full, recording, playback.



Fig 72. Brenda Laurel and Rachel Strickland *Placeholder* (1993). Crow and Fish in the hoodoo environment. Fish is carrying an empty Voiceholder and there is a portal to the right of crow.

The structure of *Placeholder* is arguably rooted in MUDs⁸. Very briefly, Multi-User Domains⁹ (MUDs) are text-based online virtual worlds that emerged in the early 1980s. The creator of a MUD is known as a wizard, and is responsible for defining the structure and content of the rooms contained in the MUD as well as the rules and social etiquette. The wizard is also tasked with keeping things interesting for the participants. These participants, who are part of a global network, interact with each other in the MUD and construct complex identities for themselves. Through this collaborative process, evocative text-based narrative exchanges emerge: “In MUDs, instead of using computer hardware to immerse themselves in a vivid world of sensation, users immerse themselves in a world of words. MUDs are a text-based, social virtual reality” (Turkle, 1995: 181).

There are two reasons for the assertion that *Placeholder*'s structure correlates with that of MUDs. The first is that MUDs are also based around *paidia*: “A MUD is not goal-oriented; it has no beginning or end, no “score” and no notion of “winning” or “success”. In short, even though users of MUDs are called players, a MUD isn't really a game at all” (Curtis, 1992: 355). The second is the pervasive presence of the goddess, who functions much like the role of the wizard within a MUD. “A player who has special permissions and commands available, usually for the purpose of maintaining the MUD, much like a ‘system administrator’ or ‘super-user’ in real-life computing systems” (Curtis, 1992: 364).

An important distinction is that the inhabitants of the MUD described by Turkle, Curtis, Murray, et al. are invested in their characters over a long period of time, spending varying amounts of time role-playing; often daily. By contrast, unless one purchased *Placeholder* (hypothetically of course; the work was most certainly not for sale due to the complex hardware running the backend and its ultimate state of incompleteness), one would only be offered the opportunity to be immersed within *Placeholder* while visiting the site of exhibition.

Furthermore, if the wizard has granted sufficient permission, MUDs provide the opportunity for the users to introduce new concepts, objects, or actions into the text-based virtual world. In *Placeholder*, the viewer's actions were limited to movements idiosyncratic to the smart costume that had been donned, communication between the two immersants and the goddess, and leaving voice messages in the numerous Voiceholders.

Ultimately, it is interesting that *Placeholder* assumes such an open structure given Brenda Laurel's previous assertion of the necessity of the “complete dramatic whole” (gleaned from Aristotle's *Poetics*) in her theories of interactive drama. Laurel had previously emphasised the Aristotelian notion of “catharsis”, suggesting that:

When the plot is such a complete whole, the end exhausts all of the dramatic potential of the beginning and middle. The dramatic effect, the arousal and catharsis of emotion, cannot be achieved, nor can the imitation be enjoyed, if the action represented is not such a “complete whole” (1986: 56).

It is these Aristotelian ties that have prompted Gonzalo Frasca to be wary of Laurel and Murray's similarly inclined proposals for interactive theatre. Reiterating Coulter-Smith's argument, Frasca notes that “One of the biggest problems of Aristotelian Poetics, as explained by such theorists as Bertolt Brecht, is that spectators get immersed into the stories and lose their ability to take a critical distance from what is happening on the stage or screen” (2004: 88).

Michael Heim has proposed that “the CAVE creates a very different experience by allowing users to acknowledge

⁸ For extensive coverage, see: Sherry Turkle, *Life on the Screen* (1995), Janet H., Murray *Hamlet on the Holodeck* (1997: 147-152), and Pavel Curtis, *Mudding: Social Phenomena in Text-Based Virtual Environments* (1992: 352-269).

⁹ “Or, with greater historical accuracy, Multi-User Dungeons, because of their genealogy from Dungeons and Dragons” (Turkle, 1995: 11).

one another in their primary bodies [...] Although peripheral, the acknowledgement nonetheless affects the background atmosphere of the shared experience” (2008: 101). Heim’s point is that by rooting the immersants within their physical bodies, they can then participate as themselves. Thus the participants are never immersed in the work to the point that they completely lose the ability to critically assess the apperceptive, “social experience of shared discovery through telepresence” (Heim, 2008: 103). This notion will be looked at in detail in the works that follow.

Maurice Benayoun – *World Skin*

Maurice Benayoun’s award-winning¹⁰ *World Skin* (1997) situates multiple active viewers within a near-monochromatic, immersive, CAVE-based, “theatre of war” (Grau, 2003: 238). Much like Jenny Holzer’s *World Two* (1993), the virtual world is set in a stark and war-torn landscape beset with a dark, cloud-ridden sky, and scorched earth [Fig 73]. The difference is that Benayoun’s landscape is inhabited by a number of soldiers, civilians, military vehicles and detritus appropriated from war photography. Beyond signifiers of nationality, there are no references to the original sources of the images; the images are homogenous within the context of the work.

Subtitled, “a photo safari in the land of war”, *World Skin* incorporates a shrewd interpretation of agency and viewer expectations. The word “safari” immediately informs the viewer that his or her interaction with the work is framed by looking at and photographing the sites encountered on a specific route. And while decisions regarding the navigation of the group through the virtual world are once again left up to a primary immersant, Benayoun astutely ensures that this is not at odds with the expectations of the other participants immersed in the work by extending a “bus driver” metaphor (Benayoun, 2005). Consequently, the work takes on a theatrical, performative edge; one viewer is cast as the tour bus driver and the others perform the role of the camera-laden tour group.

“Armed only with a camera, we are in a panorama of news pictures of many different armed conflicts - a universe of anonymous violence” (Grau, 2003: 236). The work facilitates multiple viewer interaction with specially designed camera interfaces that are used to take “photographs” of the virtual world. Taking photographs with the camera interface is accompanied with the sound of a camera’s shutter and a quick flash of light. “Capturing” an image takes on a literal meaning as whenever something is photographed, it is ripped from the scene, leaving behind a white silhouette in place of what was in the frame [Fig 76]. Thus the specific location and angle at which something was photographed will be reflected in what is captured. Consequently, the driver needs to respond to the groups’ actions by navigating towards areas that are still adorned with sections of “skin”.

At the end of the session, the viewers are presented with prints of the photographs that they have taken [Fig 79]. In this way, *World Skin* explicitly plays with the idea of the safari snapshot as keepsake. The documentation resulting from the touristic ritual of rapid-fire capturing will later substitute for the experience itself. It also enhances the active sense of agency within the work as the viewer’s actions quite literally produce tangible results (the prints). The isolated “documentary” images within these prints are pure simulacra, documentation of a war that of course does not exist, echoing Jean Baudrillard’s controversial assertion that “the Gulf War never took place” (1995). This assertion will be looked at in greater detail in the discussion of the next work.

The blanking out of the virtual world also helps the viewers maintain critical distance while they are immersed in the work. Oliver Grau notes that the extent of the “damage” caused by the cameras reaches a point where it becomes “so apparent that they are jerked out of their immersed state” (2003: 240) [Fig 77]. By removing the

¹⁰ *World Skin* was awarded the Golden Nica (the highest possible award that Prix Ars Electronica bestows) in the interactive art category in 1998.



Fig 73. Maurice Benayoun *World Skin* (1997). Installation View.



Fig 74. Maurice Benayoun *World Skin* (1997). Installation View.



Fig 75. Division Inc. *Weapons Systems in Virtual Trials* (1994).



Fig 76. Maurice Benayoun *World Skin* (1997). Sections of the virtual environment have been “skinned” by the immersants’ cameras and removed from it.

images that contribute to the immersive effect, the viewer is faced with a blank canvas that reminds them that what they have been looking at is a digital illusion, allowing for reflection.

Visually, the work extends the vocabulary of virtual reality military simulations. Division Incorporated's *Weapons Systems in Virtual Trials* [Fig 75], developed in conjunction with the US Army Research Laboratory, is described in the product monograph as such:

The HMD-wearing user is immersed in a VE [virtual environment] incorporating both urban and rural environments that are populated with enemy tanks and paratroopers. Armed with (virtual) antitank and semiautomatic weapons controlled by a handheld device, the user-soldier responds to enemy attacks as she or he navigates the representational space. High-quality three-dimensional sound helps heighten the sought-after sense of realism (quoted in Hillis, 1999: xxiii-xxv).

The parallels are clear; the main difference is the substitution of “antitank and semiautomatic weapons controlled by a handheld device” with the camera interface. Ironically, the camera in Benayoun's work does more damage within the virtual world than the weapons in the military simulation. In the military simulation, one attacks specific targets; Benayoun's camera obliterates all in its frame, be it soldier, tank or landscape.

If one applies Frasca's definition of “simulation” as to “model a (source) system through a different system” (2003: 223), *World Skin* would seemingly be a simulation of a simulation, what Baudrillard calls the fourth successive phase of the image which has “no relation to any reality whatsoever: it is its own pure simulacrum” (1994: 6). In the work, the act of photographing, particularly within the context of war journalism, is modelled through the visual vocabulary of virtual reality military simulation.

The parallels to military simulation are not limited to the work's visual nature. Oliver Grau notes that as the intensity of the experience mounts, “The behaviour of the visitor parallels that of the machine-gunners first observed in World War I, who were unable to take their fingers off the trigger of their weapons once they had begun to fire” (2003: 240). Coupled with an increasing sense of urgency caused by the soundtrack of rapid breathing noises, viewers are bombarded with flashes and shutter noises that begin to resemble “a rising crescendo of gunfire, which gets louder as the images are destroyed” (Grau, 2003: 240). Benayoun notes that: “The soundtrack is there to enable us to go beyond the play of images and to experience this immersion of a real participant in the drama” (2003: 577). Where Holzer's *World Two* focused on the aftermath of a war, Benayoun's work leads the viewer into being complicit in the destruction. Regarding this relationship, Susan Sontag observed that: “Just as the camera is a sublimation of the gun, to photograph someone is a sublimated murder- a soft murder, appropriate to a sad, frightened time” (1978: 14-15).

Despite there not being any form of score, there is also a competitive edge that emerges, that of a rush to claim territory. Each portion of the world that is photographed is removed from the world, making it unavailable to the other immersants. Therefore an image is captured in the sense that it is claimed or possessed. In this way, the printed images that are received at the end of the work serve as trophies: “This skin becomes a trophy, and our fame grows with the disappearance of the world” (Benayoun, 2005). The safari metaphor reemerges in this sense as well:

One situation where people are switching from bullets to film is the photographic safari that is replacing the gun safari in East Africa [...] In end-of-the-century-London, Samuel Butler complained that ‘there is a photographer in every bush, going about like a roaring lion seeking whom he may devour’ (Sontag, 1978: 15).



Fig 77. Maurice Benayoun *World Skin* (1997). As more and more of the environment is removed, the damage becomes so extensive that all that remains in it are ghostly white silhouettes.



Fig 78. Maurice Benayoun *World Skin* (1997). View of the virtual environment as seen without the stereoscopic shutterglasses.



Fig 79. Maurice Benayoun *World Skin* (1997). At the end of the session, immersants are presented with prints of the images that they have captured in the virtual environment.

Blast Theory - *Desert Rain*

Of the works discussed thus far, Blast Theory's *Desert Rain* (1999) arguably makes the greatest departure from the standard virtual reality technology of HMD and CAVE. Described in an article in *The Times* as "possibly the most technologically ambitious art installation ever made" (Judah, 2000), *Desert Rain's* multifaceted components occupy a space that is "part performance, part installation and part computer game" (Gardener, 2000). The work was exceptionally elaborate, and the number of steps that were actively required from each participant in order to complete it no doubt contributed to the description of *Desert Rain* as "performance". The various highly detailed sets that the viewers move through account for the "installation" aspect, while the virtual environment in which the crux of the work takes place fits the description of a "computer game".

In the first part of the work, six participants were led into a briefing room where they were given a magnetic swipe card. Once swiped, this card prompted a video briefing that explained the rules of the work to them. They learned during this briefing that the cards were also inscribed with the name of a human target that they were required to locate and "rescue" within the virtual world. Once immersed, they had 30 minutes to perform the rescue. Leaving their coats and bags behind, each participant was led one by one into a fabric cubicle that resembles a tent, and sealed inside with a zipper [Fig 80]. Each of these cubicles had a screen of falling water inside onto which the virtual world of "deserts, bunkers and tunnels" was projected (Gardner, 2000) [Fig 82]. This projection of the virtual environment onto flowing water instead of the screens conventionally used by CAVE technology was one notable innovation of *Desert Rain*.

Desert Rain's virtual terrain was navigated using a foot control panel on the floor of each of the cubicles. Viewers were also able to verbally communicate with each other using a specially designed headset. Once inside the virtual world, "the visitors [had] to meet and exchange information to complete their rescue attempt [Fig 87] and get out" (Blast Theory, 2003: 498). The idea was to work together as a team, locate the six targets, and then head towards the exit within the half hour time limit; "Those who fail die" (Judah, 2000). Those who succeeded were presented with another magnetic swipe card by a Blast Theory performer who emerged through the water screen.

In the final stage of the work, the successful participants were physically led through the water, over a sand dune and into a set that resembles a hotel room. Here the second magnetic card was swiped, and the actual person whose name functioned as the target within the virtual world appeared on the screen. It was revealed that they were all real people with very different life-altering experiences of the Gulf War - a soldier, a journalist, an actor, a peace worker and a passive spectator: "They talk about their relationship to the events, their proximity to them, about how 'real' they felt" (Blast Theory, 2003: 498).

While the amalgamated battlefield of *World Skin* seemingly denoted a sort of "everywar", *Desert Rain* was based entirely on the Gulf War, described by Baudrillard as the "first virtual war in that it was the first war to be almost entirely defined by its media coverage" (Blast Theory, 2003: 499). *Desert Rain* examined the durability of this assertion when it is applied to individuals with first-hand experience of the war. Particular emphasis is placed on peculiarities that relate to the Gulf War's death toll: "Most of the 'names' talk about casualties. None of them can agree on how many Iraqis died. Very few, the journalist says. Hundreds of thousands, the soldier says" (Armstrong, 1999). In this way, the work actively critiqued the reliability of the media in capturing the reality of an event:



Fig 80. Blast Theory *Desert Rain* (1999). View of the canvas “cubicles” which each of the six immersants occupy for the majority of the work.

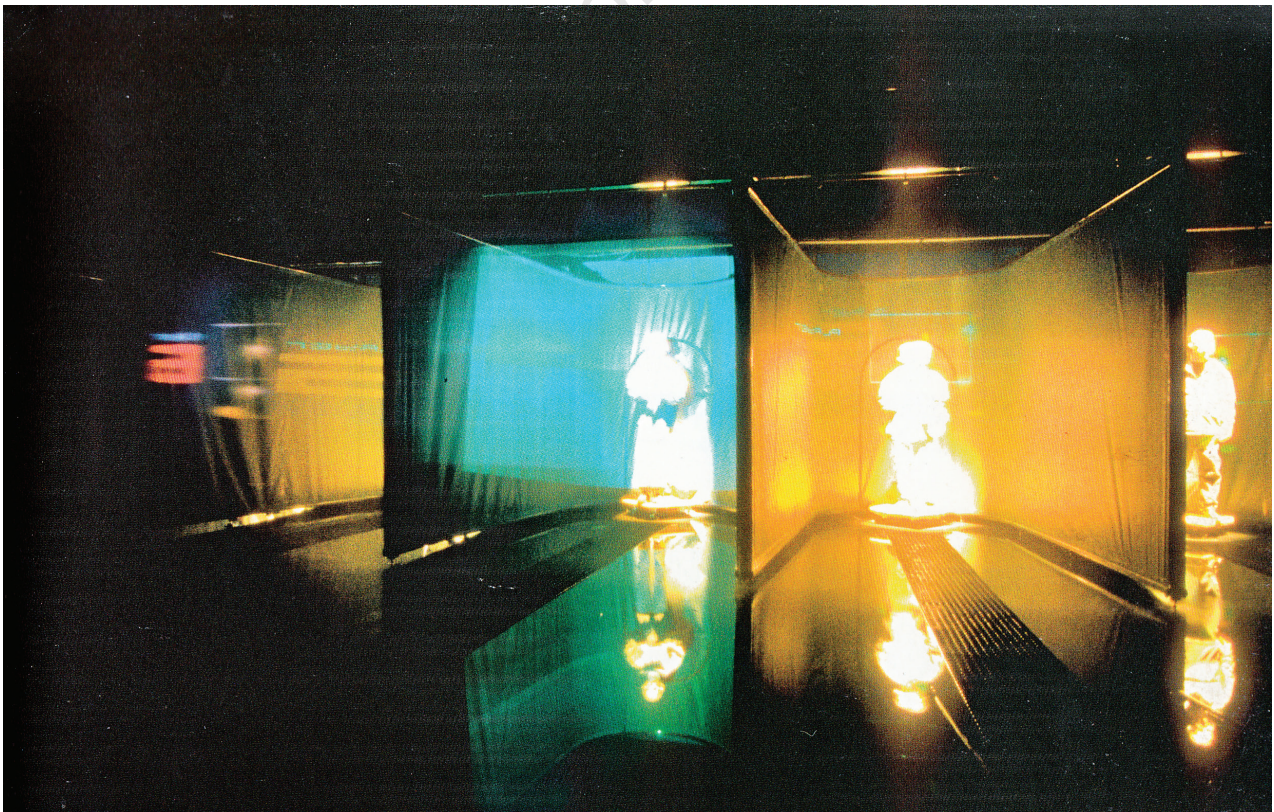


Fig 81. Blast Theory *Desert Rain* (1999). Installation view.



Fig 82. Blast Theory *Desert Rain* (1999). The immersants' view from inside the cubicles. The image on the right is an example of how the virtual environment looks when projected on to running water.

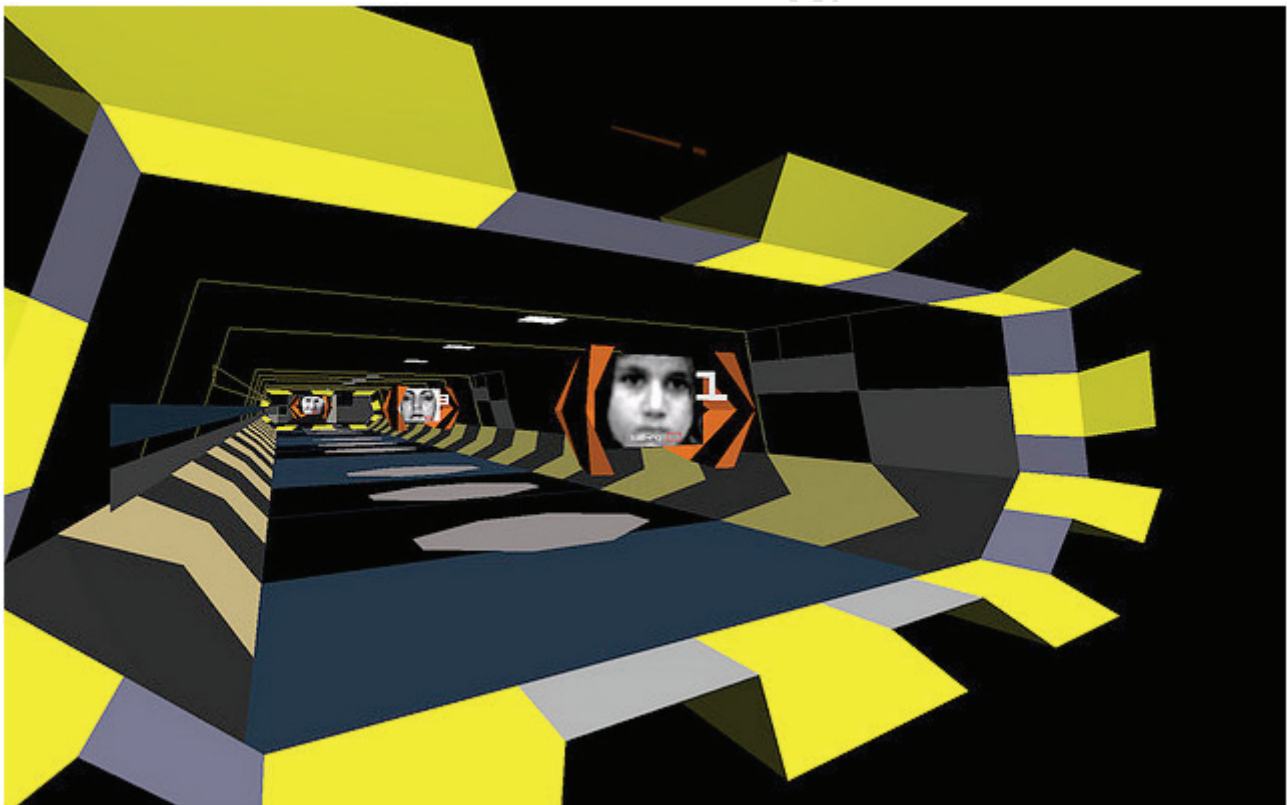


Fig 83. Blast Theory *Desert Rain* (1999). View of the manner in which each immersant is represented in the virtual environment.

It asserts that the role of the media, advertising and the entertainment industries in the presentation of events is casually misleading at best and perniciously deceptive at worst. If we can't even agree on the casualties of a war that was filmed every minute of every day... (Blast Theory's Matt Adams, quoted in Armstrong, 1999).

After the experience of the work is concluded, the participants collected their bags and coats again and left. At some point soon after, they will have found a small plastic box containing 100,000 grains of sand hidden amongst their belongings. 100,000 is the overall estimated number of Iraqi casualties in the Gulf War (Gardner, 2000). This final gesture of pathos visualises the estimated Iraqi death toll as if to say, "If the number seems trivial, this is what 100,000 of something looks like."

Frasca suggests: "Narrative may excel at taking snapshots at particular events but simulation provides us with a rhetorical tool for understanding the big picture" (2003: 228). Indeed, it is only through the complex experience of the work that the full pathos of the bag of sand becomes apparent. Paul Patton argues that the complexities of trying to estimate the death toll in the Gulf war are a major contributing factor to Baudrillard's assertion that "the Gulf war did not take place"; that this statement is in fact a dark parody:

Baudrillard's response to the subsequent events pursues the symbolic challenge to the manner in which these were portrayed. It is not irony so much as the kind of black humour which seeks to subvert what is being said by pursuing its implicit logic to extremes: so you want us to believe that this was a clean, minimalist war, with little collateral damage and a few Allied casualties. Why stop there: war? What war? (Baudrillard, 1995: 7)

As with the "machine gun" effect described in *World Skin*, the experience of interactive immersion in *Desert Rain* elicited surprising behaviour from the immersants. Lyn Gardner, describing her experience of the work, found that:

The experience does recreate some of the fear and disorientation that those on the ground during the Gulf war must have felt. Anxiety makes you behave in ways you would never have predicted. When, with time fast running out, I accidentally locate the exit, I head for it, ignoring the others' cries for help. Afterwards as we head for the room where we will come face to face with videos of each of our human targets [...] I cannot meet the gaze of my team-mates. I feel as if I really have left someone to die in the desert. (2000)

Gardner's account draws attention to the sort of emotional experience that immersive simulation can engender. Overcome with anxiety from rapidly running out of time, Gardner's survival instincts came to the fore and the rest of her team were abandoned in favour of an assured exit from the virtual war zone. The decision to act in this manner, escaping the world without her team, was entirely Gardner's own. Permitted by her agency within the work, the action was in no way prescribed. The experience was also far more resonant than if it had been part of a fixed narrative. It was not a Hollywood action star that had abandoned his or her team at a crucial point in a moment of weakness, it was Gardner.

Returning to Jenny Holzer's desire in the first chapter of wanting to "use virtual reality to highlight some issues, to try to make the problems that actually are here seem real to people, all over again" (Zurbrugg, 2004: 220), Gardner's account suggests that Blast Theory achieved just that. The process of being cast as a soldier on a rescue mission within an immersive virtual reality environment can bring about an empathy that makes the reality of soldiers' lived experience more tangible. By emulating the "dehumanizing or manipulative" effect of "when the F-15 pilot thinks of enemy planes as simple blips on his Head Up Display" (Ipolitto, 1994: 48), *Desert Rain* prompted a retrospective awareness in the viewer of the unconscious and unintentional onset of these effects once certain constraints (anxiety in this case) are implemented.

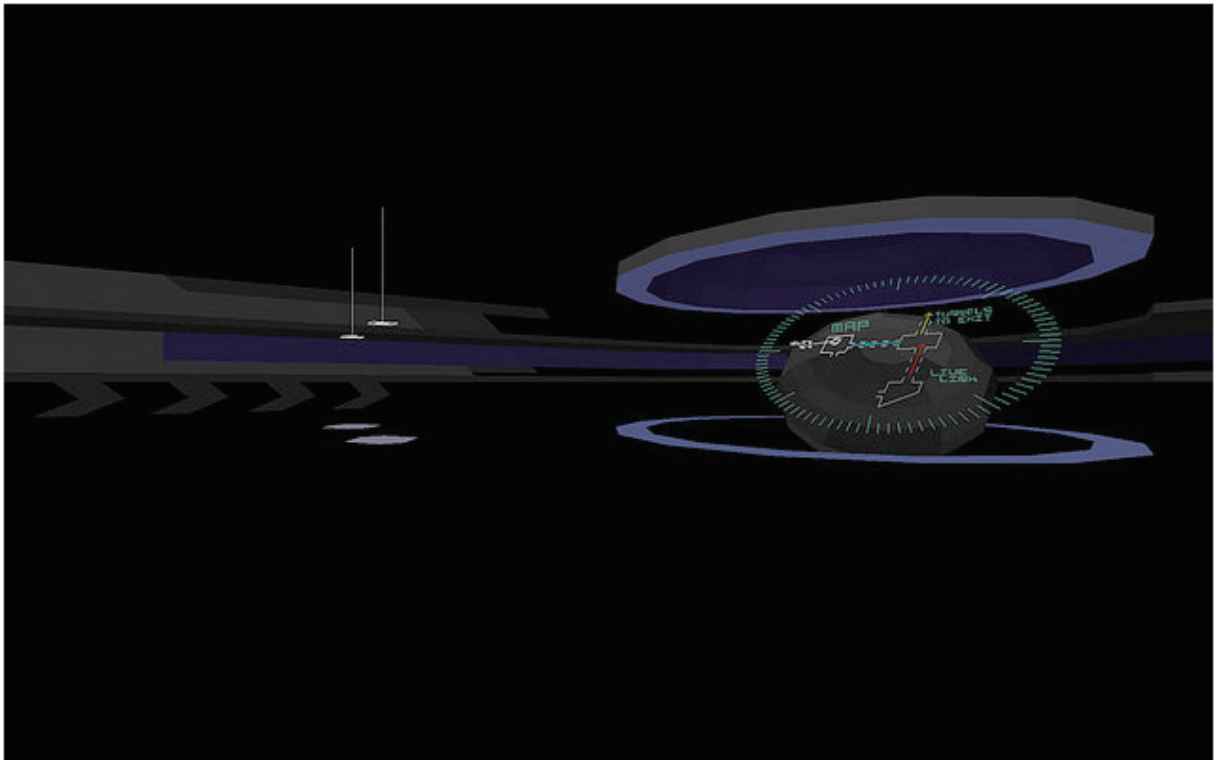


Fig 84. Blast Theory *Desert Rain* (1999). The map that is used to assist the immersants with navigating the virtual environment.

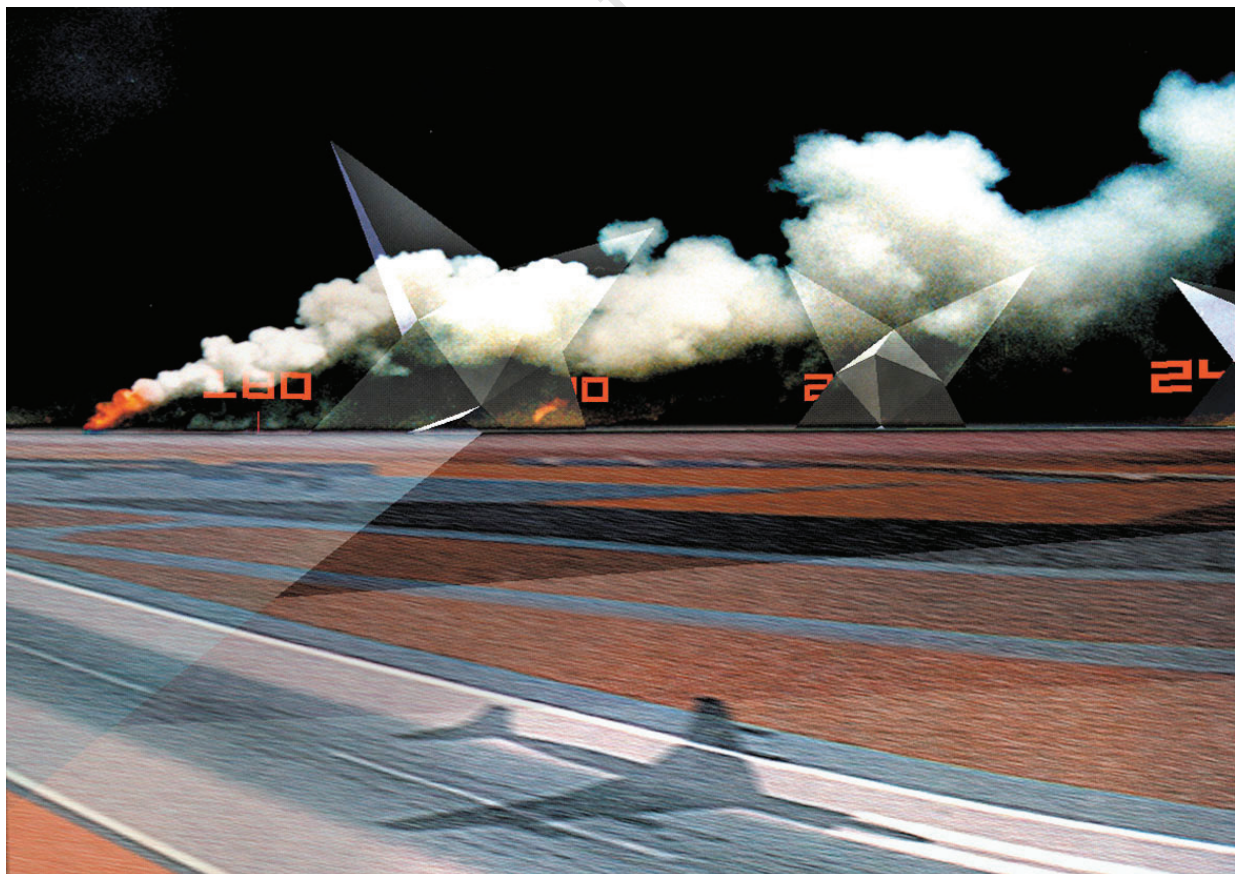


Fig 85. Blast Theory *Desert Rain* (1999).

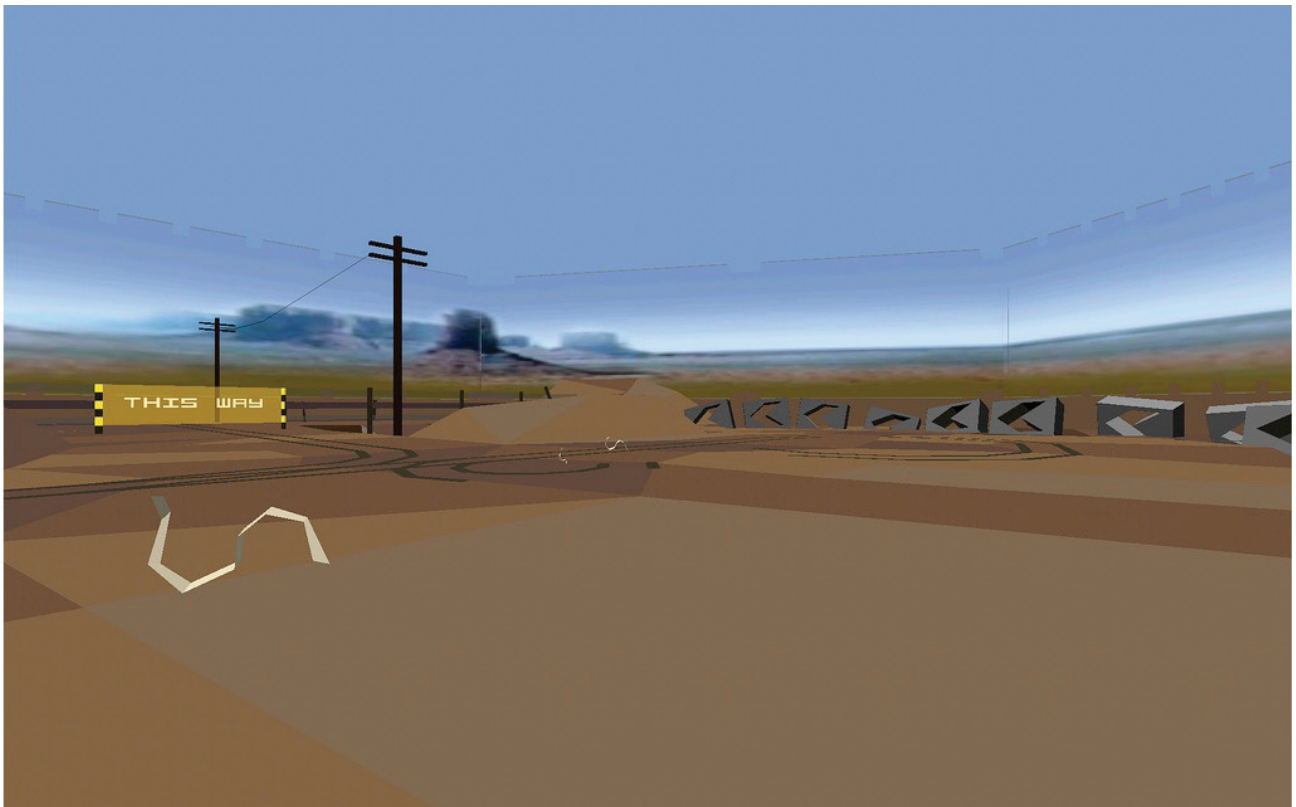


Fig 86. Blast Theory *Desert Rain* (1999).



Fig 87. Blast Theory *Desert Rain* (1999). Player 6 successfully locates his target.

Recall Roger Caillois' division of "play" and "game" into categories of *paidia* ("the form of play present in early children") and *ludus* ("games with social rules"), to which Gonzalo Frasca stated that *ludus* has rules to define a winner and a loser, while *paidia* does not (2003: 229-230). This distinction becomes complicated when considered in relation to *World Skin* and *Desert Rain*. The fact that *Desert Rain* prescribed conditions for winning (all six players had to locate their assigned names and make it to the exit within the required time limit) and losing (failure to do so) would make it seemingly easily categorised as *ludus*. Conversely, *World Skin* does not have these rules embedded in the work's structure, suggesting *paidia*.

Yet *World Skin* can potentially take on a competitive edge through the claiming of trophies. And the winning conditions of *Desert Rain* are not met with a binary measure of "success". By prescribing a "winning" condition, *ludus* asserts that one set of circumstances is preferable to another. But by unveiling the real world referents of the "names", the political content of the *Desert Rain* is unpacked and the viewer is forced to consider their complicity in the events of the war. To what side of the conflict are they aligned, and to what extent do they consider the prevalence of that side a victory?

Jeffrey Shaw and Sarah Kenderdine – UNMAKEABLELOVE

In Chapter One, it was mentioned that Jenny Holzer's *World One* was influenced by Samuel Beckett's short story, *The Lost Ones* (1972), and that a more recent work, Jeffrey Shaw and Sarah Kenderdine's *UNMAKEABLELOVE* (2008), has shared that source material. When compared, the two works provide a solid set of benchmarks showing how the use of the medium has shifted in the fifteen years that separate them. Moving beyond the obvious differences in the sophistication of the visuals, the next distinction would be the move from HMD technology to CAVE's rear-projection technology.

With the exception of Nicole Stenger's *Angels* (which predates the technology) and Brenda Laurel and Rachel Strickland's *Placeholder* (1993), every other work under discussion in this chapter assumes a variant of CAVE's rear projection approach to virtual immersion. This says a lot, both about the nature of the works under discussion in this chapter, and the sorts of works to which CAVE is more conducive than HMD. It also draws attention to the genealogical connection of projection onto screen that CAVE shares with cinema¹¹.

In comparing how both works implement Beckett's story, it is clear that Shaw and Kenderdine's work is more in keeping with the source material than Holzer's. Beckett's story focuses on a "flattened cylinder fifty metres round and sixteen high" in which 200 "lost bodies roam, each searching for its lost one" (1972: 7). This cylinder constantly undergoes extreme temperature fluctuations, "[passing] from one extreme to the other in about four seconds" (Beckett, 1972: 8). The inhabitants' bodies have become severely weathered by these constant fluctuations in temperature and they inhabit the space according to a system made up of four different character types: i) "Those perpetually in motion", ii) "Those who sometimes pause", iii) "Those who short of being driven off never stir from the coign that they have won", and iv) "Those who do not search [...] sitting for the most part against the wall" (Beckett, 1972: 13-14). This last category is also referred to as the "vanquished" (Beckett, 1972: 30).

All 63 pages of the story are dedicated to describing the cylinder and the curious ways in which it functions, and it is difficult to concisely but comprehensively summarise it here. The story constantly contradicts itself, a trait that David Porush suggests is intentional on Beckett's part (1984: 162). Holzer translated Beckett's cylinder into a torus and located the immersed viewer inside along with "cubeheads" (Holzer's representation of the lost

11 See: Kenderdine & Shaw, 2008a.



Fig 88. Jenny Holzer *World One* (1993).



Fig 89. Jeffrey Shaw and Sarah Kenderdine *Unmakeablelove* (2008). Indicative of 15 years of immersive virtual reality progress when contrasted with Fig 85.

ones) that interact by either fleeing from or engaging with the viewer once they are approached, relaying one of the artist's truisms in the event of the latter. The relation between Holzer's work and Beckett's text ends there; despite mentioning a schism in the society over whether the means of escape from the cylinder lie in the walls or on the ceiling, Beckett gives no actual indication that the wandering bodies can communicate orally. And of course in Beckett's story, they are in fact bodies and not floating cubes with a face on each side.

As with *Desert Rain*, Shaw and Kenderdine's work facilitates six equally active viewers simultaneously and, in an inversion of CAVE, situates them outside of the implied virtual space [Fig 90-91]. This virtual space is composed of six rear-projected screens arranged into a hexagonal shape. Highly detailed motion captured and computer-generated "lost ones" move through the virtual space inside the cylinder. Most of the screen is engulfed in darkness and the viewer is required to shine a controller interface that resembles a torch onto the section of screen directly in front of them, revealing the wandering bodies within. The bodies react to the light, looking directly at the viewer and responding to the light's movements [Fig 94]. The light streams from the other participants are also seen in the virtual space, facing the appropriate directions.

Shining the "torch" over a viewer standing on the opposite end of the installation allows one to be able to see parts of that viewer on one's screen [Fig 95]. Given that there is a solid screen in front of each viewer (rather than anything transparent), this effect of "illuminating" the person opposite is achieved through "infrared cameras that are positioned on each screen, pointing at its respective torch operators" (Kenderdine & Shaw, 2008a). The video images are then processed through the infrared cameras and rendered in real time onto each viewer's screen.

The way the work is constructed could perhaps be argued as problematic within the definition of virtual reality in this discussion. However, the computer-generated environment is still immersive and convincing to the senses of its existence despite not surrounding the viewers (indeed, *they* surround the virtual environment instead). Viewers are still persuaded of their presence in relation to the environment, and the virtual inhabitants actively respond to their actions. Situating the viewers outside of the cylinder contributes to a strong overarching sense of otherness to the wandering bodies, while their reaction to the viewers' torchlights ensures that the viewer still feels as though they exist within the same space as the virtual bodies.

Referred to as "augmented reality", this interplay between physical and virtual reality is not inappropriate to the thematic content of the short story itself. As David Porush has observed, throughout the language in the narrative of *The Lost Ones* is a conflict between the "machine language" of "positivist logic, technical efficiency and computer-like order" and "the language of the flesh", "heir to all the ills flesh is heir to: softness, decay, inefficiency, irrational doubt and inconsistency" (1984: 162). Porush means to say that while the story begins with definite descriptions and measurements of the cylinder (the machine language), this "decays" into incorrect calculations, uncertainty and intentional contradiction (the language of the flesh) within Beckett's prose.

Although it could never have been intended as such, the text could be read in the same vein as a Lawrence Weiner instruction work. Viewed in this way, "A flattened cylinder fifty meters round and sixteen feet high for the sake of harmony" (Beckett, 1972: 7) suddenly bears resemblance to the "A 36" x 36" REMOVAL TO THE LATHING OR SUPPORT WALL OF PLASTER OR WALLBOARD FROM A WALL" instruction in Weiner's 1968 work of the same title [Fig 92]. "Scientific in its exactitude" (Kenderdine & Shaw, 2008a), Beckett's text provides the necessary information to create the environment without actually doing so: "The simple declarative sentences, definitions, descriptions and phrases [...] are reminiscent [...] of instructions for assembly of a model or the rules of a game" (Porush, 1984: 162).



Fig 90. Jeffrey Shaw and Sarah Kenderdine *Unmakeablelove* (2008). Installation view.

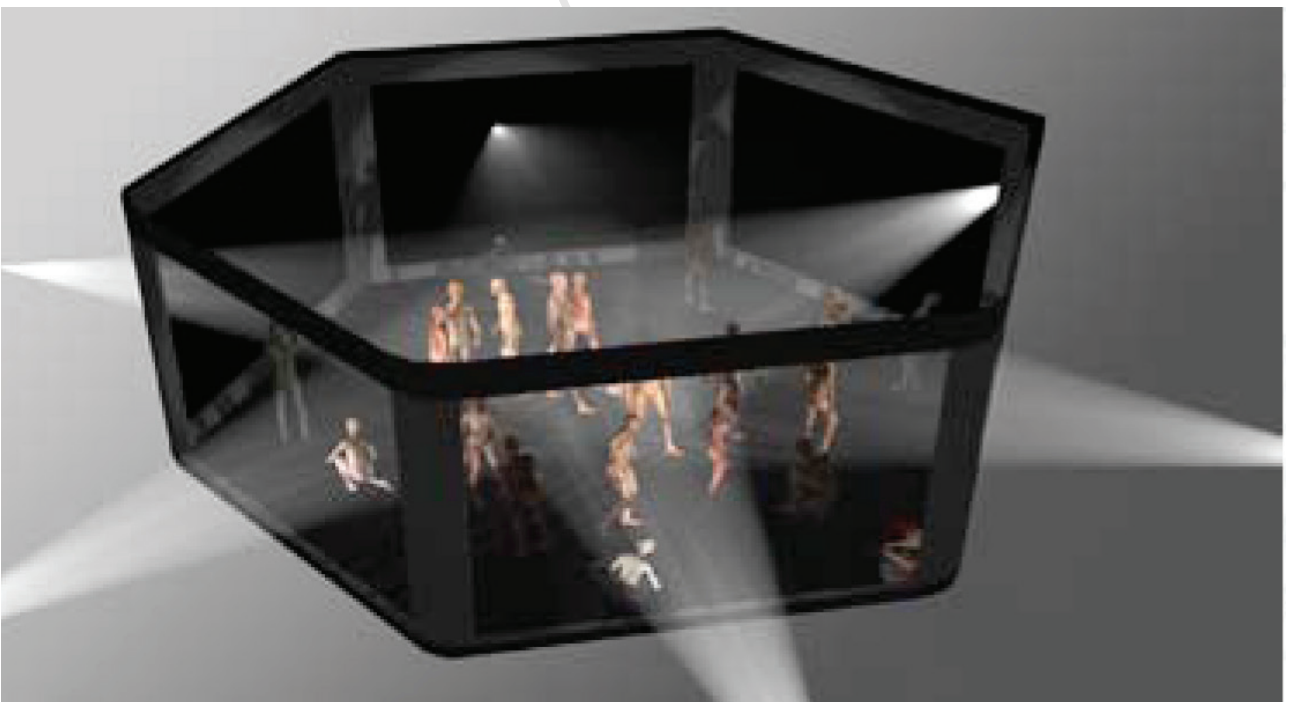


Fig 91. Jeffrey Shaw and Sarah Kenderdine *Unmakeablelove* (2008). Diagram depicting the Re-Actor projection system.

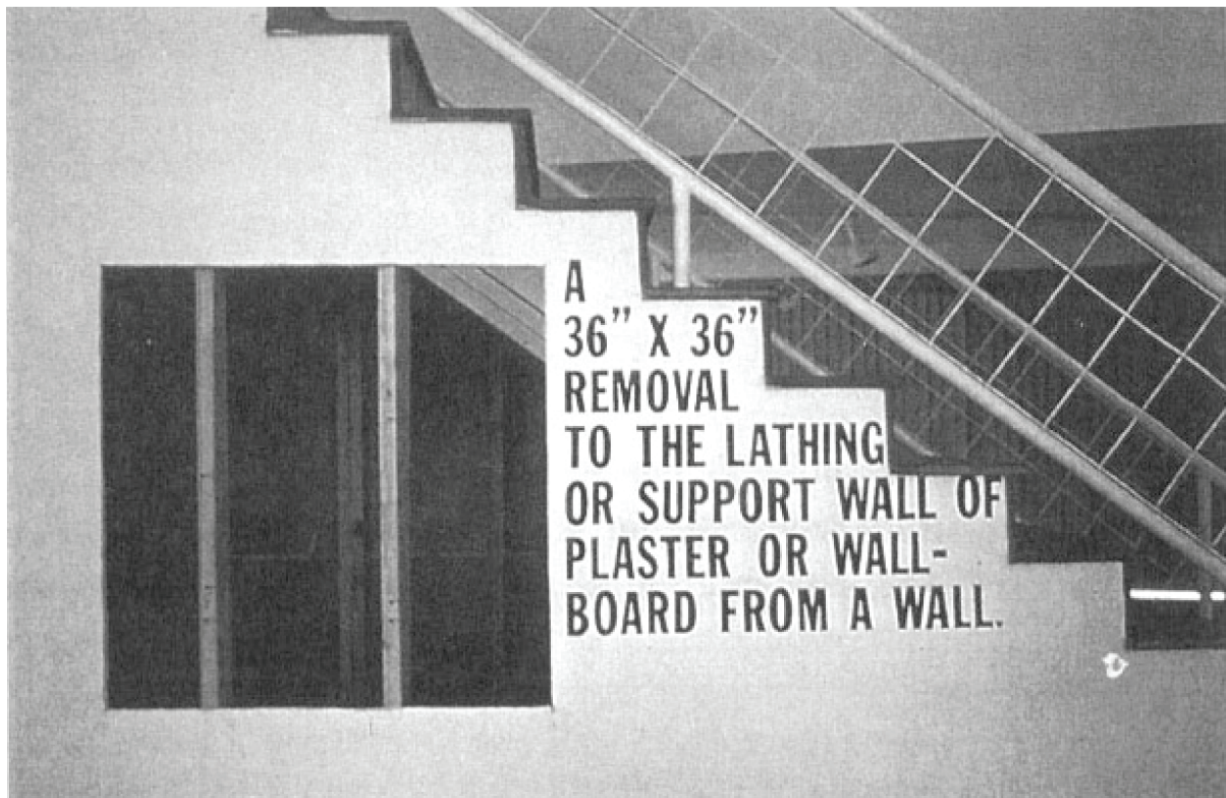


Fig 92. Lawrence Weiner *A 36" X 36" REMOVAL TO THE LATHING OR SUPPORT WALL OF PLASTER OR WALL-BOARD FROM A WALL* (1968).



Fig 93. Jeffrey Shaw and Sarah Kenderdine *Unmakeablelove* (2008). View without shutterglasses.

This is not to say that there are no amendments to Beckett's cylinder in *UNMAKEABLELOVE*. For one, there are 30 lost souls as opposed to the 200 in Beckett's story. But since much of the screen is engulfed in darkness, the missing souls are not really detrimental to the work as the viewer has no idea as to what lies beyond the scope of the torch light. The work also removes the fifteen ladders and the network of niches and tunnels in the wall from the cylinder, resulting in the inhabitants' movements in the virtual space being limited to wandering about, standing and sitting. All of these movements are generated in real time, which means that the exact experience of the work will be different each time.

If the work appears to be passive VR, this is only because so much of *UNMAKEABLELOVE* relies on the viewer to reflect on their position in relation to the virtual environment. Where *World One* was a solitary experience, in *UNMAKEABLELOVE* the visible presence of the other immersants is crucial to the work's intentions. The simple act of allowing each viewer to see the other viewers within the space serves to facilitate critical distance because it reminds them of their separation from the cylinder while emphasising the effectiveness of the sensory immersion. This seemingly minor addition has substantial implications for the reading of the work and demonstrates the sophistication of Shaw's handling of the medium following over four decades of experimentation¹².

The gesture is a masterstroke because if, according to Frasca and Coulter-Smith, purely immersive works resist critical distance due to being entirely escapist or experiential, then allowing the viewers to see each other reminds them of their grounding in physical reality. Simultaneously however, the gesture has the effect of drawing the viewer and those around them deeper into the work. Suddenly there is an "us and them" dichotomy between those trapped in the cylinder and those observing them, introducing the notion of complicity into the work. That the "lost ones" acknowledge the viewer's presence by responding to the torch light only serves to enhance the effect. In this way, the beam of light forms a visual representation of the viewer's penetrating gaze.

An aspect of Beckett's text that is never addressed is how this cylinder and its inhabitants came to be. *UNMAKEABLELOVE* "locates Beckett's society of 'lost ones' in a virtual space that represents a severe state of physical confinement, evoking perhaps a prison, an asylum, a detention camp or even an extreme 'reality' TV show" (Kenderdine & Shaw, 2008b). The cylinder could also be looked at as an interpretation of purgatory, a view that has some substantiation in Beckett's description of the non-searchers for the most part sitting against the wall "in the attitude which wrung from Dante one of his rare wan smiles" (1972: 14). The implications for the role of the viewers in this scenario become particularly complex.

Besides this question of how the lost ones came to be there, another question begged by the work is who the lost ones are and where did they come from? There are hints towards an existence prior to the one that they now find themselves in, notably in passages such as

Relatives and friends are well represented not to speak of mere acquaintances. Press and gloom make recognition difficult. Man and wife are strangers two paces apart to mention only this most intimate of bond. Let them move on till they are close enough to touch and then without pausing on their way exchange a look. If they recognise each other it does not appear. Whatever it is they are searching for it is not that (Beckett, 1972: 36).

The fact that infants are present within the system is also indicative of a previous life, as Beckett explicitly

12 For a detailed overview of Shaw's work up until 1997 see Shaw, Duguet, Klotz & Weibel (1997). Particularly relevant is Anne-Marie Duguet's essay *Jeffrey Shaw: From Expanded Cinema to Virtual Reality*, which locates early examples of expanding cinema beyond the screen and simultaneously incorporating audience interaction in Shaw's work as early as 1966.

states that reproduction is impossible in the cylinder due to the harsh fluctuations of temperature that “[robs] nudity of much of its charm as pink turns grey and transforms into a rustling of nettles the natural succulence of flesh against flesh. The mucous membrane itself is affected which would not matter greatly were it not for its hampering effect on the work of love” (Beckett, 1972: 53). It is in relation to this that Beckett uses the phrase, “unmakeable love”, which Shaw and Kenderdine extracted for the work’s title.

Not all works (be they book, film or any other medium) are ideally suited to being appropriated into an interactive immersive installation. As a medium, an immersive virtual reality installation has specific conventions and a source text will need to have elements that can be enhanced by them. Thus while Beckett’s short story may be conducive to interpretation as an immersive virtual work, something like Arthur Miller’s *Death of a Salesman* (1949) (to use a random example) is certainly not.

UNMAKEABLELOVE marks a very sophisticated translation of a story into an immersive virtual installation. Much of this conduciveness could be attributed to the fact that Beckett’s entire text is devoted to describing the environment within the cylinder, and there is not much by way of what could be called a plot. There are a few characters that receive specific descriptions and could thus be considered protagonists, for example: the “woman with white hair [...] leaning against the wall [...] and mechanically clasping to her breast a mite” (Beckett, 1972: 30); the “woman vanquished” who “squats against the wall with her head between her knees and her legs in her arms” while her “red hair tarnished by the light hangs to the ground” (Beckett, 1972: 56); and “last of all if a man” who “parts the heavy hair and raises the unresisting head” of the red-haired latter, at which point he “finds at last his place and pose” (Beckett, 1972: 62).

Using these characters as markers, one is able to observe a constantly shifting narrative in *UNMAKEABLELOVE*. In Beckett’s story, it is implied that the cited male and the red haired female characters are husband and wife from whatever life it was that preceded the cylinder. The story concludes with the culmination of their “unmakeable love”. In Kenderdine and Shaw’s work, the characters’ behaviour is driven by computer algorithms, allowing their actions to change in response to the surrounding bodies and the presence of the viewers’ torch beams.

Whatever occurs inside the cylinder during the experience of the work, from conflict to copulation, is based on a combination of algorithmic chance and the collective actions of the viewers [Fig 96]. Hence the experience of the work “is different every time” (Kenderdine quoted in Zukerman, 2011). In *UNMAKEABLELOVE*, the sexual encounter can only occur when the husband and wife characters are in close proximity. This does not contradict the narrative of Beckett’s text; it merely allows for the equal probability of all other possibilities of the narrative direction to occur. Hence unlike the “multiple choice” that Dove was so against, *UNMAKEABLELOVE*’s narrative is dynamic, fluctuating and, barring the state of the work when it is first booted-up, without any real sense of beginning or end.

Another point about *UNMAKEABLELOVE* is that it is the only work in this chapter to include interactive, responsive, computer-controlled entities within the virtual environment that perpetuate an illusion of virtual agency. Earlier, Janet Murray was quoted as saying that in order to make computer-controlled agents work, “one must limit their domain of expertise” (1997: 217). By dividing the lost ones into four categories and assigning specific traits to each, Beckett had already defined the region of agency exerted by each character group. Shaw and Kenderdine merely had to apply these traits through the algorithms that underlie each character. Consequently, the distinctions between the different lost ones’ virtual personalities are very recognizable in the final work.

In *Desert Rain* there were the targets that each player was required to locate, but these existed only as labelled



Fig 94. Jeffrey Shaw and Sarah Kenderdine *Unmakeablelove* (2008). The lost ones respond in real time to the viewers' torch beams.



Fig 95. Jeffrey Shaw and Sarah Kenderdine *Unmakeablelove* (2008). Viewers are able to illuminate each other in the virtual environment by shining their torch beam over the other viewers.



Fig 96. Jeffrey Shaw and Sarah Kenderdine *Unmakeablelove* (2008). The actions of the lost ones unfold dynamically according to computer algorithms and the direction of the torch beams. Sometimes a fight will spontaneously occur (as can be seen here).

portrait objects within the virtual environment until the second magnetic card was swiped and a specific identity was attached to the face. Even then, there was no interaction with the players because the videos were pre-recorded. The targets' identities became more significant in relation to the work, but they were not interactive and had no agency.

World Skin's soldiers can be interacted with insofar as their images can be ripped from the virtual world, but again they have no ability to resist or respond to the photographer/immersants beyond their susceptibility to being photographically skinned.

Archeology of a Mother Tongue comes closest to including virtual agents by incorporating an environment that responds to the viewer and their movements, triggering audio clips of the coroner and pathologist or expanding into larger environments that can be navigated. However these are objects rather than "living" entities. A work like *Placeholder* is entirely made up of human agents.

This all points to why *UNMAKEABLELOVE* is a particularly successful immersive virtual reality work: it effectively addresses many of the concerns that have been expressed throughout this chapter by various individuals and does so in a succinct and effective manner. While Gonzalo Frasca was concerned about immersion's potential to counteract critical distance, *UNMAKEABLELOVE* prompts critical reflection by adopting an augmented reality approach that brings physical reality into the work and causes the viewer to question their relationship with the virtual world.

Toni Dove was averse to the replacement of intellectual challenge with multiple choice and pondered if there are "ways to tell a story that will not be broken through participation? Are there stories in which an amplified voyeurism combines linearity and an emergent narrative through immersion and physical sensation" (Dove, 2002: 211)? *UNMAKEABLELOVE* tells a story that is a complete expression of its source text (without making prior reading of Beckett's story a requisite for appreciating the work), and the immersed viewer's enjoyment of this story is enhanced through participation rather than broken by it.

That said, the work is not particularly conducive to Laurel's Aristotelian catharsis as there is no linear structure to the narrative; it unfolds dynamically according to algorithms. This makes any notion of beginning, middle and end problematic as any events that contribute to the formulation of narrative will be defined by the length of time that the viewer spends watching the piece rather than anything fixed and embedded in the form of the work. Regardless, the work does provide logical and tangible consequences to the viewer's actions, allowing at the very least for Murray's notion of agency to be implemented. Given the constraints presented by the structure of the work, the viewer is not disappointed by the level of interactivity that *UNMAKEABLELOVE* offers.

In his 1979 book, *Eloge du cinema experimental* [In Praise of Experimental Cinema], French writer Dominique Noguez proposed five impulses that he believed to belong to the sphere of expanded cinema. The third of these was: "A convergence of cinema with the theatrical arts, tending toward a return to the body [...] [and] characterised by actual presence (implying three dimensionality), contact and unreproducibility" (translated in Dugeut, 1997: 26). While the viewer's presence in the works under discussion is a virtual presence rather than an actual one, these traits still apply. The works are irreproducible in that they showcase a definite break from a prescribed narrative, where narrative (as described by Frasca) is a fixed sequence of events. Instead the immersants assume roles and engage with the virtual worlds, resulting in narrative that emerges through their choices in retrospect. As such, the specific events that take place during a session are unique to that particular run with those particular participants, and are therefore impossible to reproduce exactly.

All of the works discussed in this chapter place importance on the viewer fulfilling a specific role, and by implication place importance on the viewer. Whether assuming the role of another (*Placeholder, Archeology of a Mother Tongue*) or as themselves (*World Skin, Desert Rain, UNMAKEABLELOVE*), it is the immersed viewer's interaction with the work that is significant. In this sense, the works become theatrical and performative (especially to the audience watching), but also cinematic in that the viewers are immersed within an image space. Where 3D cinema was directed at "you" as an isolated viewer, many of the works under discussion in this chapter instead address an "all of you". Thus the passively viewed "object of simultaneous collective reception" that Walter Benjamin described (1936: 116) is transformed into an immersive object of simultaneous collective participation.

University of Cape Town

CHAPTER FOUR

IMMERSIVE VIRTUAL REALITY IN CYBERSPACE

On the back part of the step, toward the right, I saw a small iridescent sphere of almost unbearable brilliance. At first I thought it was revolving; then I realised that this movement was an illusion created by the dizzying world that it bounded. The Aleph's diameter was probably little more than an inch, but all space was there, actual and undiminished. Each thing (a mirror's face, let us say) was infinite things, since I distinctly saw it from every angle of the universe. I saw the teeming sea; I saw daybreak and nightfall; I saw the multitudes of America; I saw a silvery cobweb in the centre of a black pyramid; I saw a splintered labyrinth (it was London).

-Jorge Luis Borges, *Aleph* (1971: 26-27)

"Time" has ceased, "space" has vanished. We now live in a global village [...] a simultaneous happening.

-Marshall McLuhan, *The Medium is the Message* (1967: 63)

As stated previously, this thesis is framed by the influence of three facets of Gibsonian cyberspace on the development of immersive virtual reality installation; that of *disembodied, interactive immersion* in a *networked computer-generated dataspace*. While the second chapter looked at the notion of disembodiment, the third chapter examined the notion of immersive interactivity. In this final chapter, discussion will centre on the notion of networked or distributed immersive virtual reality. The underlying question in this discussion is why would it be useful to incorporate a networked aspect to immersive virtual reality artworks? If the defining traits are immersion and interactivity, what is gained from the inclusion of a networked aspect that is not present in other immersive virtual reality scenarios?

There are three immediate answers to this. The first is that with the networked aspect, immersants no longer need to be located in a single physical location; networked immersive virtual reality potentially allows for interaction with immersants from across the globe (technology and infrastructure willing). The second answer is that it allows for simultaneous immersion, where every immersant has equal agency. By linking multiple virtual reality systems, each system is allowed its own tracking information, facilitating multiple points of view of the same virtual environment.

Finally, by networking distributed sites, the works would be able to facilitate an immersive virtual reality experience in cyberspace. It is at this point that the distinction between virtual reality and cyberspace needs to be swiftly dealt with. Stated generally but concisely, the difference lies in the fact that virtual reality immersion is not specifically required to go beyond the scope of an isolated activity, while cyberspace emerges through distributed connections between communication technologies but is not necessarily immersive.

Recall that Gibson described his cyberspace as being:

A consensual hallucination experienced daily by billions of legitimate operators, in every nation [...] A graphic representation of *data abstracted from the banks of every computer in the human system*. Unthinkable complexity. Lines of light ranged in the *nonspace of the mind*, clusters and constellations of data. Like city lights, receding... (Gibson, 1984:51) [Emphasis added]

The key points for the discussion at present are that cyberspace is a “nonspace” that is derived as a “consensual hallucination” from “every computer in the human system”.

To locate a current official definition of cyberspace, the *UK Cyber Security Strategy* that emerged from 2011’s ‘London Conference on Cyberspace’ employed the following definition of cyberspace: “Cyberspace is an *interactive domain made up of digital networks* that is used to store, modify and communicate information. It includes the internet, but also the other information systems that support our businesses, infrastructure and services” (Cabinet Office, 2011: 11) [Emphasis added].

Again, the notion of a “domain made up of digital networks” is important as it draws attention to the idea that cyberspace exists in the spaces between network nodes. Looking at the broader history of this notion, Bruce Sterling suggests in the introduction to *The Hacker Crackdown* (1992) that:

A science fiction writer¹ coined the useful term “cyberspace” in 1982. But the territory in question, the electronic frontier, is about a hundred and thirty years old. Cyberspace is the “place” where a telephone conversation appears to occur. Not inside your actual phone, the plastic device on your desk. Not inside the other person’s phone, in some other city. *The place between* the phones. The indefinite place *out there*, where the two of you, two human beings, actually meet and communicate. (Sterling, 1992: unpaginated) [Original emphasis]

Thus while virtual reality does indeed create the impression of a virtual space, without sharing information with other networked technologies, it technically does not enter into the third space of cyberspace. The works under discussion in this chapter are therefore concerned with the overlapping point between cyberspace and immersive virtual reality.

Myron Krueger – VIDEOPLACE

Myron Krueger’s *VIDEOPLACE* is one of the earliest (if not the first) examples of work that facilitated the simultaneous presence of distributed active participants in a computer generated environment. An “undisputed pioneer of interactive art”, Krueger first launched the *VIDEOPLACE* project in 1970 and introduced “many of the basic concepts of virtual reality by developing unencumbered, full-body participation in computer-created telecommunications experiences” (Popper, 2007: 182).

While *VIDEOPLACE* cannot be described as fully immersive (at least in terms of how the term has been defined in this thesis), the project was still informed by the desire to achieve “full body participation in computer events that were so compelling that they would be accepted as real experience” (Krueger, 1991: xiii). Krueger intended his “artificial realities” (as he referred to them) to be experienced “unencumbered”, meaning that the viewers did not need to don any special equipment on their person before interacting with the computer-generated environment. It is in this unencumbered experience that Krueger felt the distinction to lie between his project and the “wearable, encumbering” method of the HMD. Nevertheless, he also expressed the view that they were “separate paths leading to the same goal” (Krueger, 1991: xiii).

In Krueger’s work, viewers would stand in front of a projector which (in a process similar to the green screen chroma-keying used in television weather reports) would then translate the silhouette of their body image into the computer-generated artificial reality. This silhouette was always a single uniform colour, although the colour itself would vary, set against a solid black background. The participants could interact with the environment in various ways, from being able to draw with their hands [Fig 99] to interacting with a computer-controlled

1 Referring to William Gibson



Fig 97. Myron Krueger *VIDEOPLACE* (1974- 1990s). The computer-controlled CRITTER that responds to the actions of the user's *VIDEOPLACE* silhouette.



Fig 98. Myron Krueger *VIDEOPLACE* (1974- 1990s). Over the years, Krueger has designed numerous *VIDEOPLACE* environments. In this one the user's silhouette is carried by balloons over a colourful, computer-generated landscape.



Fig 99. Myron Krueger *VIDEOPLACE* (1974- 1990s). *VIDEOPLACE* environment where the user is able to draw lines with their hands.



Fig 100. Myron Krueger *VIDEOPLACE* (1974- 1990s). Interaction between a networked *VIDEODESK* and *VIDEOPLACE*.



Fig 101. Myron Krueger *VIDEOPLACE* (1974- 1990s). Two *VIDEOPLACES* networked.

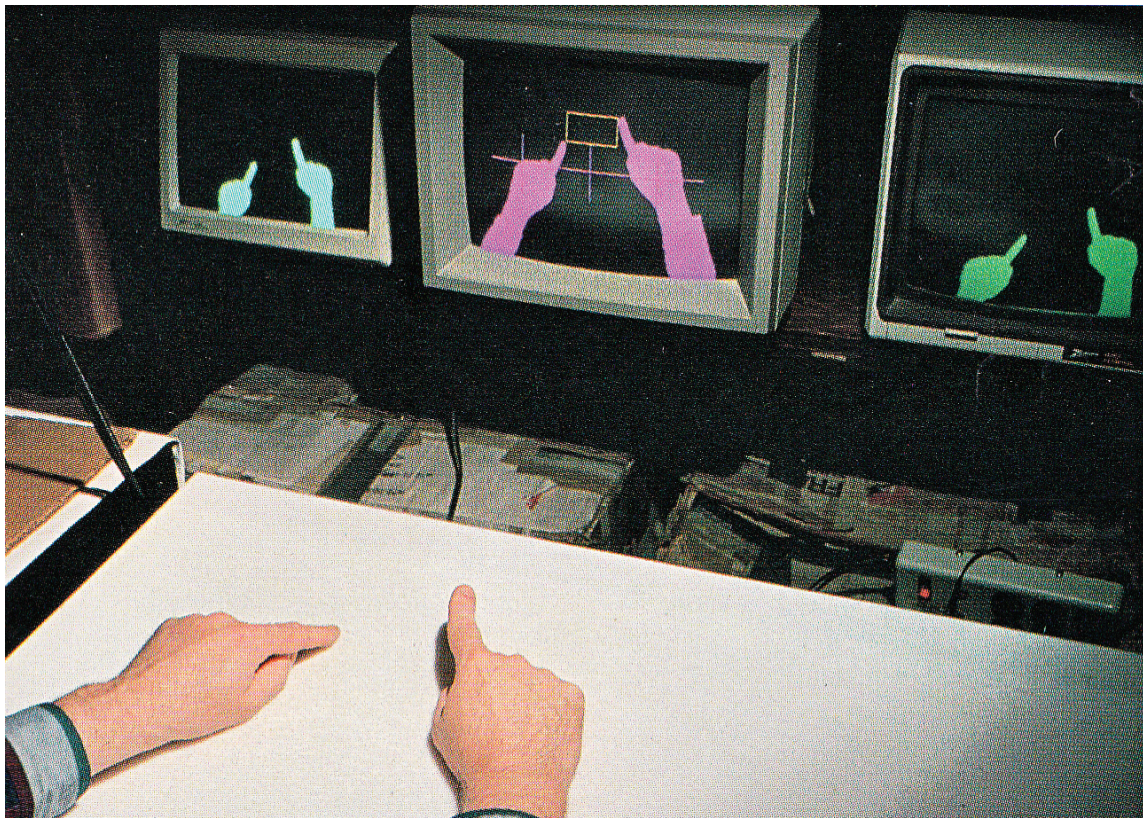


Fig 102. Myron Krueger *VIDEOPLACE* (1974- 1990s). Installation view of the *VIDEODESK* application.

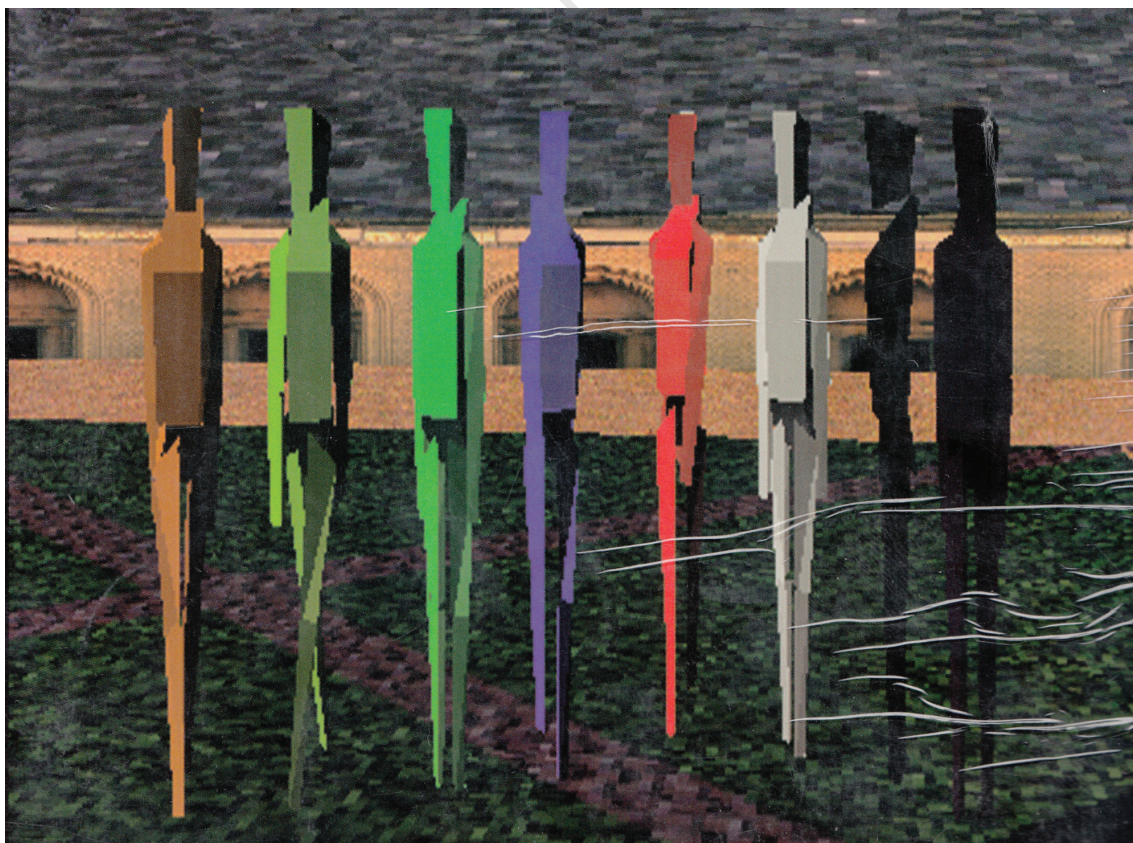


Fig 103. Studio for Creative Inquiry *Virtual Polis* (1993). The avatars that were used in the prototype version of *Virtual Polis*.

CRITTER that would continuously attempt to elude them [Fig 97].

While there are numerous variations² of the project, the grouping that concerns us is the series of works that fused multiple *VIDEOPLACES* together, often with the inclusion of one of Krueger's *VIDEODESK* installations [Fig 102]. As the name implies, the *VIDEODESK* was a desk that resembled a lightbox. The participant would place their hands over the lightbox and the silhouette of the hands would be translated into the shared environment where they could interact with the full body images of the participant(s) in the *VIDEOPLACE*. This shared environment (the "videoplace" that the title alludes to) formed a crucial part of the work and marked an intersection between disparate sites in which the participants' silhouettes would appear to be existing in the same space and could interact accordingly [Fig 100-101]. For instance, a participant in New York could toss a ball to a participant in California (Krueger, 1991:39).

Krueger proposed placing linked *VIDEOPLACE* installations across the globe as early as July 1974, but was unsuccessful due to the unwillingness of various key United States departments to invest in the project, possibly due to its lack of military applications (Krueger, 1991: 41-43). The project was first introduced in 1975 at the Milwaukee Art Museum with two linked installations placed approximately 91 meters apart (Krueger, 1991: 43).

Because immersion was not a central concern of Krueger's work, it will not be dealt with in depth here. What is important is that the various incarnations of *VIDEOPLACE* present a computer-generated common ground for participants from disparate locations to simultaneously and actively interact with each other and to be imbued with the same level of agency.

Worth noting is that Krueger concludes the *VIDEOPLACE* chapter of his frequently-cited book, *Artificial Reality II* (1991), with a proposal for the next step in *VIDEOPLACE*'s evolution:

I would like to tie together many *VIDEOPLACE* environments across a great distance. Each participant would enter a large and complex graphic world from a different physical location[...] The participant could interact with the others or could leave the current location and travel to a different part of the graphic world. Along the way, she would encounter other participants from other real world locations. Such a megaenvironment could include hundreds of participants (Krueger, 1991: 62).

Studio for Creative Inquiry - *Virtual Polis*

In further discussing this notion of a "megaenvironment", Carl Loeffler and Lynn Holden's *The Networked Virtual Art Museum: The Temple of Horus* (1993) makes a reappearance. As mentioned in the first chapter, *The Temple of Horus* was designed to be included as part of a larger *Networked Virtual Art Museum*. The global networking capabilities of the *Networked Virtual Art Museum* were publically demonstrated between Carnegie Mellon University and the Expedition'92 conference in Munich in September 1992, and between Carnegie Mellon and the International Conference on Artificial Reality and Tele-existence in Tokyo, July 1993 (Loeffler, 1994a: 33). Following the 'Virtual Reality: An Emerging Medium' exhibition at the Guggenheim, the scope of the project was significantly increased once again to form part of the Studio for Creative Inquiry's *Virtual Polis* (1993).

Designed as a "three-dimensional, computer-generated city, inhabited by a multitude of participants joined by

2 See: (Krueger, 1991) for a fully detailed account of the various projects.



Fig 104. Lucasfilm's *Habitat* (1986).

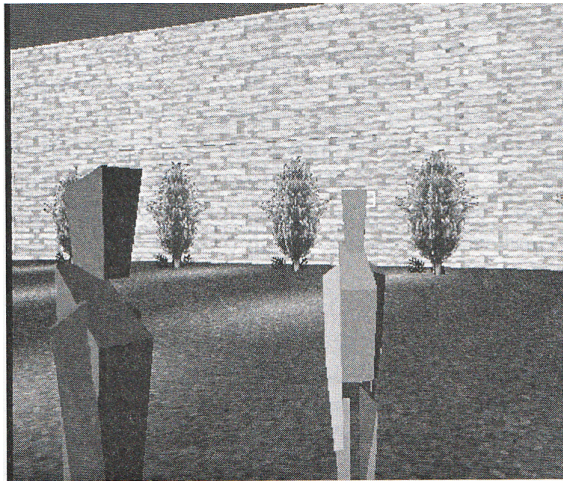


Fig 105. Studio for Creative Inquiry *Virtual Polis* (1993). Further view of the avatars.

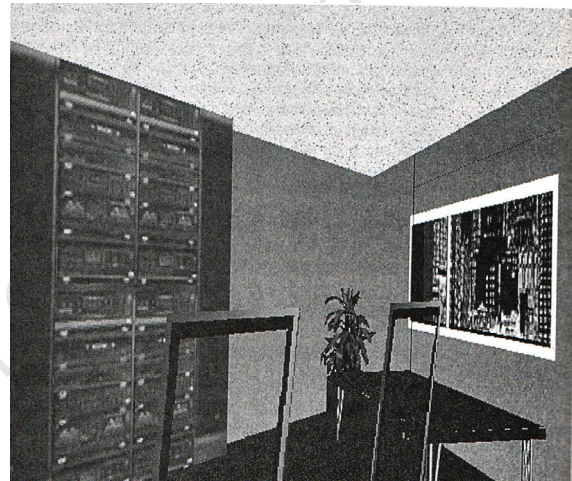


Fig 106. Studio for Creative Inquiry *Virtual Polis* (1993). An apartment in *Virtual Polis*. These apartments are private spaces and can only be entered by those with permission from the owner.

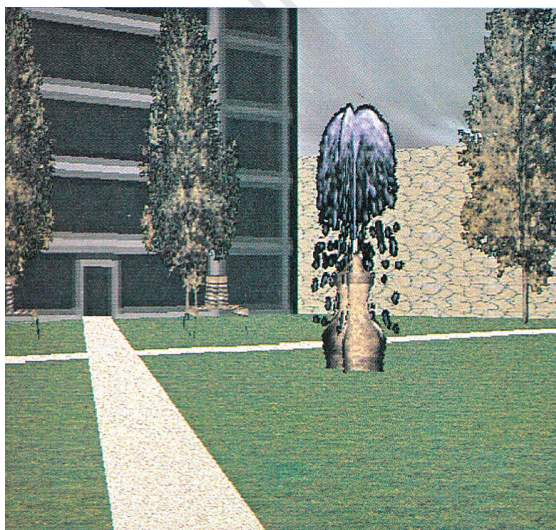


Fig 107. Studio for Creative Inquiry *Virtual Polis* (1993). The fountain in the park, one of many public spaces in *Virtual Polis*.

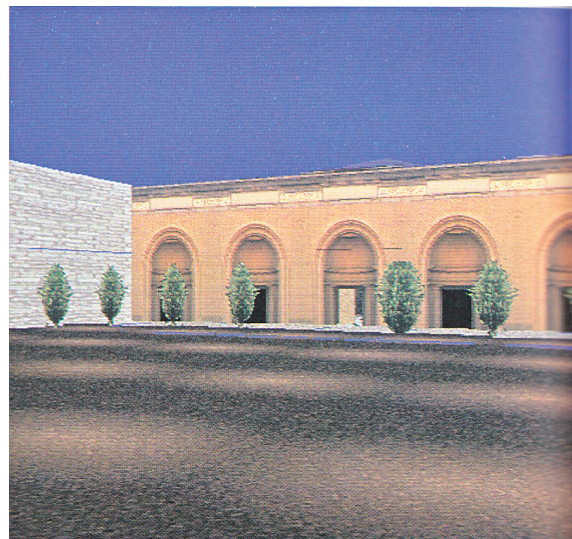


Fig 108. Studio for Creative Inquiry *Virtual Polis* (1993). The *Networked Virtual Art Museum* as seen in *Virtual Polis*.

a means of telecommunications” (Loeffler, 1994b: 60), this far more ambitious version was demonstrated in prototype form at VR Vienna-’93 in December 1993, “where it was met with a high level of success” (Loeffler, 1994b: 73). Here it marked the first simultaneous *immersion* in virtual reality from three separate international locations, namely Pittsburgh, Tokyo and Vienna. The term “immersion” is important, as it emphasises that the type of virtual reality was an immersive HMD-based one. This distinction is crucial, as we have just noted that multiple users could be present within Krueger’s *VIDEOPLACES*, and (in the previous chapter) that MUDs were often referred to as text-based virtual realities and would frequently be inhabited by far more than three users linked from across the globe.

There is also Lucasfilm’s *Habitat*³ (1986), which was “one of the first attempts to create a very large-scale, commercial, many-user, graphical virtual environment” (Morningstar & Farmer, 1991: 273) [Fig 104]. Running on the Commodore 64 home computer system (which was already outdated at the time), the design of *Habitat* was informed by the contention that: “The defining characteristic of cyberspace is the sharedness of the virtual environment, and not the display technology used to transport users into the environment. Such a cyberspace is feasible today, if you can live without head-mounted displays and other expensive hardware” (Morningstar & Farmer, 1991: 298).

Loeffler argued that it was exactly this display technology that placed *Virtual Polis* “in a class of its own” (Loeffler, 1994b: 62). In comparison to its precursors, it “comprised of a distributed three-dimensional environment”, involving “articulated three-dimensional representations” of the immersants, and was significant for “its projected interface for art, education, home-based entertainment and work” (Loeffler, 1994b: 62).

The world of *Virtual Polis* was composed of a large-scale city with a mixture of private spaces (the apartment complexes [Fig 106]) and public spaces (including stores, automobile showrooms, museums, a travel agency and a park [Fig 107]). In the prototype version, *The Temple of Horus* featured as the sole destination on offer by this travel agency.

In the demonstrations of this early version, immersants were represented in the virtual world as featureless, uniform full-body avatars, distinct in the choice of colour that the immersant selected [Fig 103]. The immersants’ head movements and arm movements were tracked by the hardware and were reflected in the virtual world. There were plans to eventually incorporate facial expressions (Loeffler, 1994b: 72).

Loeffler noted that in 1994, *Virtual Polis* was “still a research project, although it is intended for introduction to the general public” (1994b: 63). While information is lacking as to when exactly the project was discontinued, the fact that the technology required to realise the work within the home environment was far from ready may account for its discontinuation. Oliver Grau explains that: “Loeffler’s views were formulated at a time when the World Wide Web did not exist, transfer rates of realtime virtual reality images were very slow, and high speed computers were too expensive for the average user” (2003: 290). Bear in mind that this was also a time where usage of the telephone and the Internet were mutually exclusive, meaning that connecting to the world of *Virtual Polis* would have been achieved at the expense of the ability to telecommunicate with the external physical world.

While Loeffler himself admits that his account of the project is filled with a “healthy dose of enthusiasm” (1994b:73), it should be stressed that the ideas informing it were not pulled out of thin air. At the time, MUDs and *Habitat* had demonstrated that plenty of people were more than happy to dedicate substantial amounts

3 See: (Morningstar& Farmer, 1991) for a full account of the “lessons of Lucasfilm’s *Habitat*”.

of their time to an online, virtual existence. Presently, Massively Multiplayer Online Role Playing Games (MMORPGs)⁴ and online virtual worlds such as Linden Lab's *Second Life* continue to testify to this.

Virtual Polis was directly influenced by the model of cyberspace (referred to as “the Metaverse”) in Neal Stephenson's 1992 cyberpunk novel, *Snow Crash*; Loeffler in fact quotes directly from Stephenson in an essay on *Virtual Polis* (1994b: 60). The Metaverse is an immersive networked computer-generated universe that is spherically shaped and centred on the Street, “a grand boulevard going all the way around the equator of a black sphere with a radius of a bit more than ten thousand kilometers. That makes it 65,536 kilometers around, which is considerably bigger than Earth”⁵ (Stephenson, 1992: 23). There is a central monorail that runs across the Metaverse to help the inhabitants travel across the virtual space.

The Metaverse ties in to *Virtual Polis* in the sense that it functions as a gigantic virtual city, complete with public spaces and recreation facilities, in which avatars are assumed and possessions and property can be acquired:

Like any place in Reality, the Street is subject to development. Developers can build their own small streets feeding off of the main one. They can build buildings, parks, signs, as well as things that do not exist in Reality, such as vast hovering overhead light shows, special neighborhoods where the rules of three-dimensional spacetime are ignored, and free-combat zones where people can go to hunt and kill each other (Stephenson, 1992: 23).

What is important is that all of this is housed within what is quite literally a virtual world. The Metaverse is a cyberspace contained as an inhabitable sphere of clearly-defined shape and size.

The cyberspace of Gibson's work is far less homogenous. In *Mona Lisa Overdrive* (1988), the character Gentry (a former console cowboy who now lives a reclusive existence in an abandoned factory in the middle of an industrial wasteland known as Dog Solitude) is obsessed with the idea that “cyberspace had a Shape, an overall total form” (75). Slick Henry, another inhabitant of the factory, is sceptical of this notion on the grounds that, in his view, cyberspace is made up of heterogeneous, independent representations of data. These representations can be altered on the whim of their owners, so “how could you figure the whole matrix had a particular shape?” (Gibson, 1988: 76).

Lev Manovich similarly suggests that “the ‘space’ of the Web in principle can't be thought of as a coherent totality: it is a collection of numerous files, hyperlinked but without any overall ‘perspective’ to unite them” (1995). Joseph Nechvatal in turn has expressed the opinion that Manovich's view has a “limited focus” (1999: 66).

For Nechvatal, “cyberspace is a hyper-unified whole because every server of the Internet must behave like any other server: the same requests must evoke the same responses” (1999: 64). He suggests that “perhaps it is more intelligible to speak of one (total) world where multiple realities simultaneously coexist, overlap and interpenetrate” (1999: 68). This assertion is akin to Deleuze and Guattari's rhizomatic notion of “a book all the

4 “Computer-network mediated games in which at least one thousand players are role-playing simultaneously in a graphical environment” (Filiciak, 2003: 87).

5 25,461km to be exact, given that the circumference of the Earth is 40, 075km.

6 This is also where the distinction between the World Wide Web and the Internet lies. The Internet is the conglomeration of global information networks, while the World Wide Web is a specific means of disseminating structured information over that mass of networks.



Fig 109. Jeffrey Shaw *The Legible City* (1989-1991).

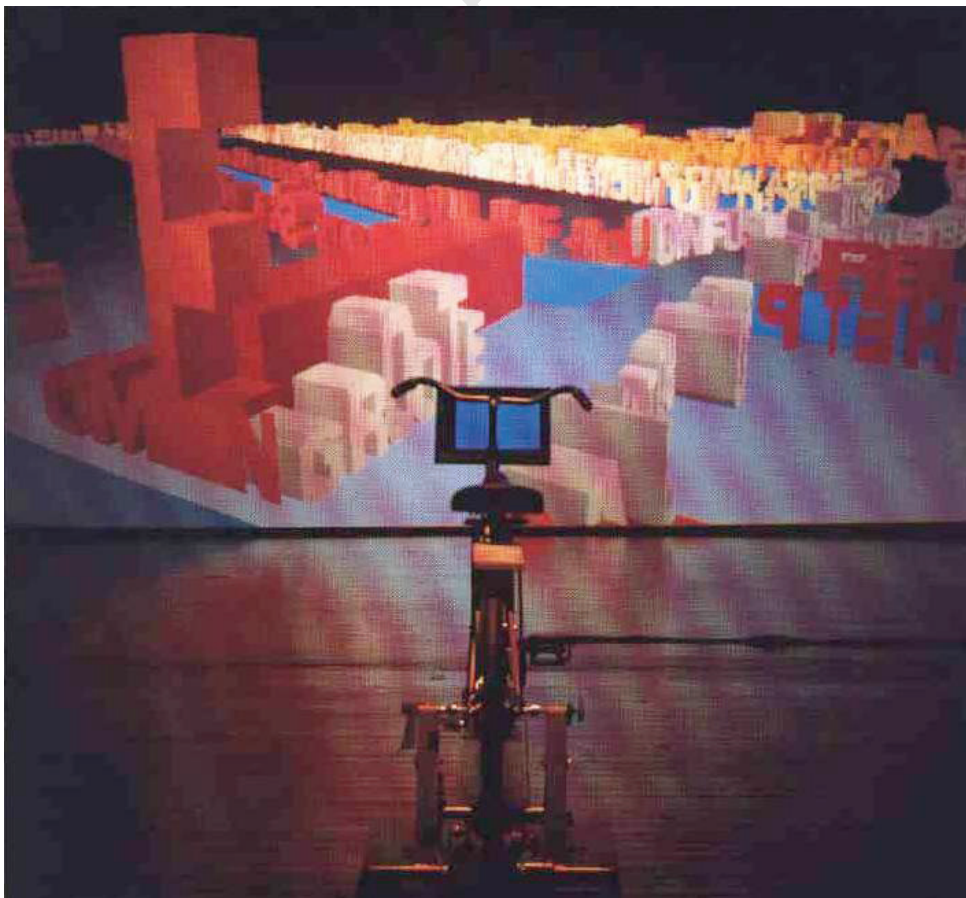


Fig 110. Jeffrey Shaw *The Legible City* (1989-1991). Installation view.

more total for being fragmented” (1987: 6).

Jeffrey Shaw - *The Legible City* and *The Distributed Legible City*

The rhizome emerges again in the navigable virtual city of Jeffrey Shaw’s *The Legible City* (1989-1991) and *The Distributed Legible City* (1998) in a manner that will be discussed momentarily. In answer to the question posed at the beginning of this chapter (what is gained through the inclusion of a networked aspect that is not present in other immersive virtual reality scenarios?), these twin artworks provide a case study of two works where one functions as the networked version of the other.

First realised in prototype format in 1988 with wireframe graphics and a joystick controller, the final version of *The Legible City* remains Jeffrey Shaw’s signature work. Perched atop an exercise bike, the immersed viewer pedalled and steered the bicycle controller through virtual reconstructions of three cities: Manhattan, Amsterdam and Karlsruhe. The virtual environments were projected onto a large screen that was positioned in front of the cyclist-immersant [Fig 109-110]. These virtual reconstructions were based on the actual ground plans of the cities, the difference being that all the architecture has been replaced with texts [Fig 111]. At the front of the handlebars there was a screen that displayed a map of the city being navigated. There was also a switch allowing the cyclist-immersant to switch between cities in an instant (Klotz, 1997: 6).

The Manhattan environment was slightly different to the other two in that the text consisted of “eight separate fictional storylines in the form of monologues by ex-Mayor Koch, Frank Lloyd Wright, Donald Trump, a tour guide, a confidence trickster, an ambassador and a taxi-driver” (Shaw, 2002a). Each story thread had been assigned a specific colour, informing the cyclist-immersant as to which story they were following. The texts in the other two cities were largely derived from “archive documents that describe mundane historical events there” (Shaw, 2002a). They were also scaled proportionately in accordance with the actual buildings that they substituted for. In contrast then to William J. Mitchell’s notion of a “City of Bits”, Shaw’s work located the cyclist-immersant in a virtual “City of Hypertexts”.

George Landow and Paul Delany have suggested that “hypertext provides an infinitely re-centerable system whose provisional point of focus depends upon the choices made by a truly active reader” (1991: 230). In this sense, the work presented a literal enactment of navigation through hypertext. The viewer’s experience of the work was defined by cycling through these cities, selecting fragments of story arcs to follow and switching between the locations/texts at will⁸. Insofar as this system was “infinitely re-centerable” and allowed for the sections of text to continuously be joined in dynamic ways by a truly active, frequently changing reader, it was rhizomatic.

“Any point of a rhizome can be connected to anything other, and must be. This is very different from the tree or root, which plots a point, fixes an order” (Deleuze & Guattari, 1987: 7). As a result, the rhizome is comprised of an “acentered system, finite networks of automata in which communication runs from any neighbour to any other, the stems or channels do not pre-exist, and all individuals are interchangeable, defined only by their *state* at any given moment” (Deleuze & Guattari, 1987: 17) [Original emphasis].

7 See: (Mitchell, 1996).

8 This conceptual model of hypertext is slightly different to the working real-world model of Hypertext that is used in World Wide Web browsers. There, the hyperlinks that connect the different elements are embedded within the texts themselves. The reader activates the hyperlinks (usually through clicking on them) but the links are defined and part of the structure of the webpage itself rather than arising from the reader joining fragments at whim.

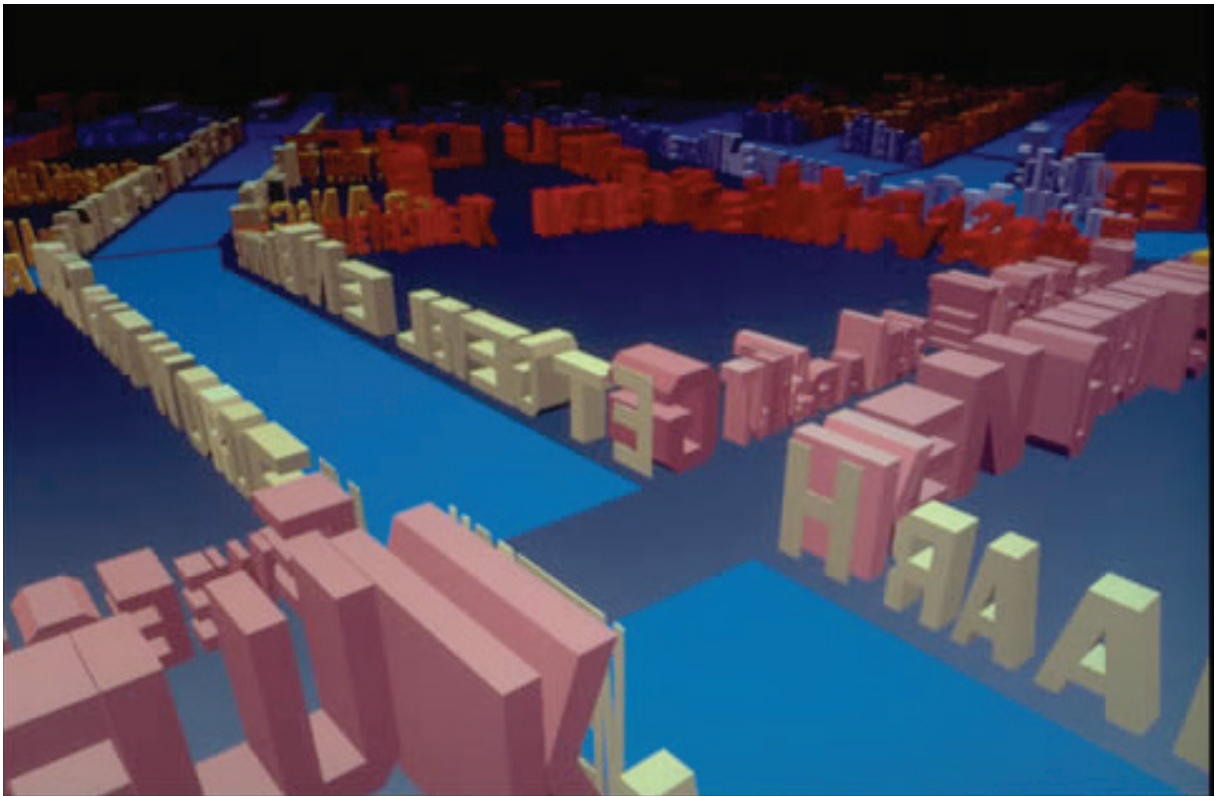


Fig 111. Jeffrey Shaw *The Legible City* (1989-1991). Each of the textual storylines has a different colour so that the immersant can distinguish which thread they are following.



Fig 112. Jeffrey Shaw *The Distributed Legible City* (1998). Installation view. Note that immersants now wear HMDs while immersed in the work.

Shaw's follow-up piece, *The Distributed Legible City*, added networked immersion to the experience of the work. The inclusion of two or more immersants forced many changes and additions to the structure and navigation of the city. In order to be visible to each other, each cyclist-immersant in *The Distributed Legible City* was represented by an avatar who was likewise mounted on a bicycle. The cycling gestures of the animated avatars were synched to those of the immersants' physical bodies. Head-Mounted Displays were introduced in order to resolve issues that had been experienced regarding the immersants' fixed point of view on a screen in front of them [Fig 112]. Naturally the participants wanted to be able to see each other and this became tricky when they were riding next to each other. The avatars' behaviours were therefore extended to reflect the head orientation of the users with the tracking information from the HMDs, enabling the other participants to tell when they were being looked at (Advanced Interfaces Group, 1999).

When they were close enough to each other, immersants in *The Distributed Legible City* were also able to communicate verbally, and the work introduced two animated birds that would fly between the two, helping the immersants to locate each other [Fig 114].

Rather than being an uninhabited ghost town that is navigated in isolation, the work transformed into a site of responsive activity. It was up to the viewers to decide how they wished to respond to each other; the only factor that was assured is that they were not alone in the environment. Immersants could choose to co-operate with each other, navigating the hypertext as a sort of sight-seeing endeavour (assisted by the avatars' reflections of the viewers' head movements and the direction of their gaze).

Alternatively, the fact that the movements of the participant's physical body directly affected the speed at which the avatar moved, also allowed for a more competitive streak to emerge; cyclist-immersants may have felt compelled to race each other. The fact that the avatars were uniformly coloured in primary colours made this action resemble a decidedly more gallant (and far slower) take on the infamous "light cycle" sequence in Steven Lisberger's cult 1982 film, *Tron*⁹. However, unlike the sequence in *Tron*, the immersants are not able to cause each other to crash.

While the decision to be competitive in *The Distributed Legible City* was permitted by the structure of the work, it was in no way prescribed or enforced. In light of the discussion of *ludus* and *paidia* in the previous chapter, a victory in this case would not be read as a preferable condition by the work, merely a possible one.

Thus by simply including the possibility of simultaneous immersion, the fundamental dynamics of the work were shifted significantly. As Jeffrey Shaw notes:

The texts are no longer the sole focus of the user's experience, but instead becomes the con_text (both in terms of scenery and content) for the possible meetings and resulting conversations (meta_texts) between the bicyclists [...] [T]he artwork changes from being merely a visual experience, into becoming a visual ambiance for social exchange between visitors to that artwork. (2002b) [Emphasis added]

Here Shaw emphasises the distinction between immersive virtual reality and immersive virtual reality in cyberspace. The former is a self-sufficient visual experience, while the latter, through arising from a shared space of communication between distributed sites, instead becomes a "visual ambiance" for social exchange.

Maurice Benayoun - *Crossing Talks Communication Rafting*

⁹ There is also something very *Tron*-like in the way that city maps are loaded in grid formation sequentially from top to bottom, much like how Jeff Bridges's character Kevin Flynn is scanned into the computer mainframe in the 1982 film.

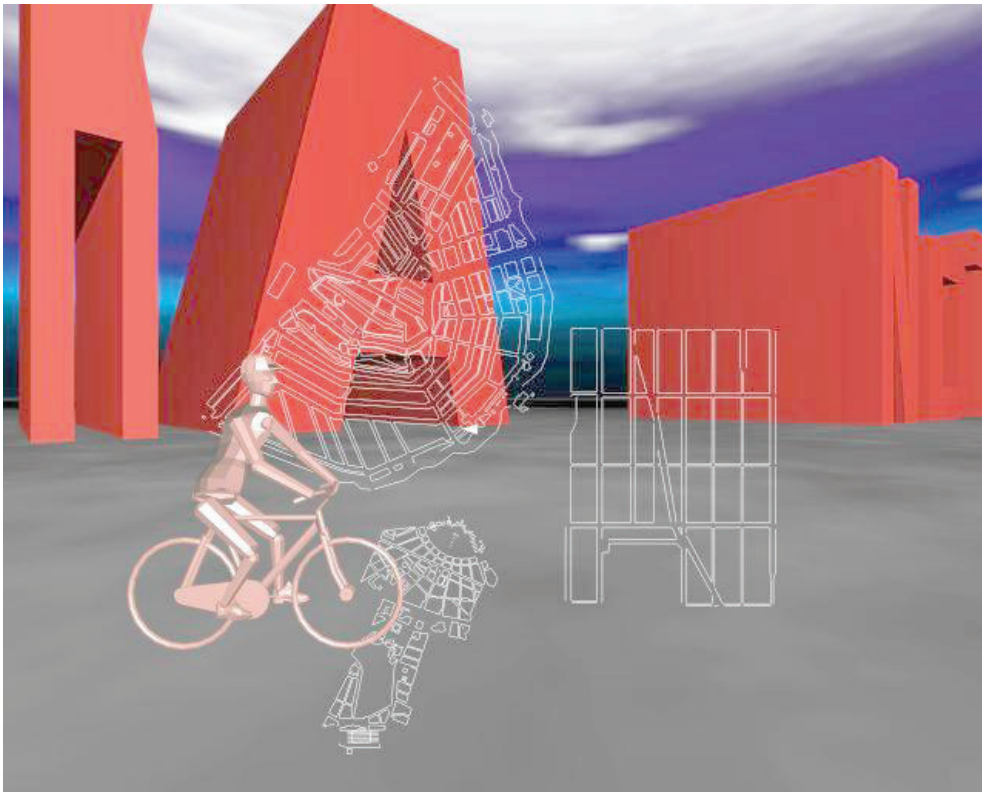


Fig 113. Jeffrey Shaw *The Distributed Legible City* (1998). Due to the HMD, immersants can no longer simply look down at their map, so it needs to be displayed in front of them. Next to the map is the avatar of the other cyclist-immersant.



Fig 114. Jeffrey Shaw *The Distributed Legible City* (1998). One of the birds which fly between the two immersants, helping them to locate each other.



Fig 115. Maurice Benayoun *Crossing Talks Communication Rafting* (1999). The CAVE raft when unbalanced. The illusion is completed by donning the stereoscopic glasses.

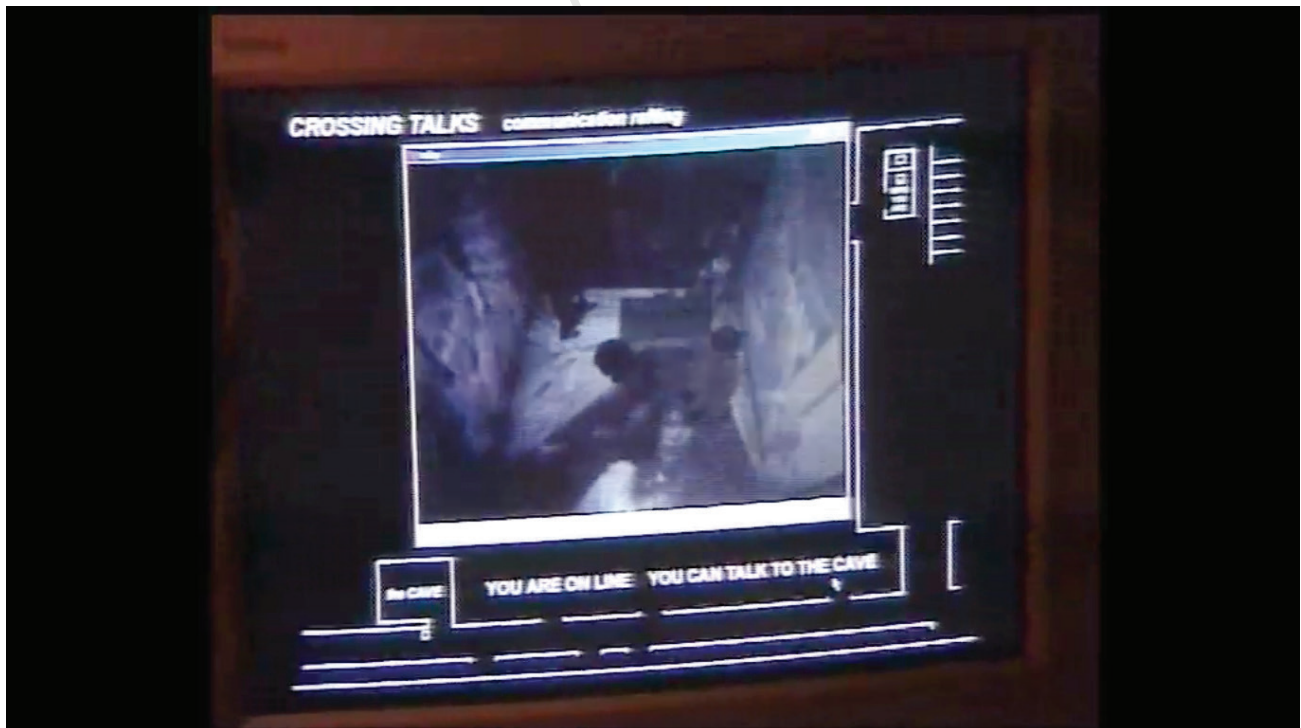


Fig 116. Maurice Benayoun *Crossing Talks Communication Rafting* (1999). The onscreen view when one of the webcam users becomes the active wall and is able to communicate with the CAVE. The text at the bottom of the screen reads: "You are online, you can talk to the CAVE".

This point of social exchange is picked up in Maurice Benayoun's *Crossing Talks Communication Rafting* (1999), in which the artist sought to look at the different levels of communication present in a cyberspace exchange. Here Benayoun underscores the fact that being located within cyberspace does not negate the fact that one is also concurrently located in physical reality.

Crossing Talks was experienced in one of two very different ways; either physically inside the CAVE installation that made up the central component of the work, or through the Internet. In the case of the former, multiple viewers entered a CAVE environment where webcam streams from the Internet were projected onto the walls of the CAVE. For the immersants wearing the mandatory stereoscopic glasses, these projections appeared to form a fluid, continuous space that surrounded them.

In the Internet experience of the work, participants accessed a specific website that allowed them to stream the image contained within the frame of their webcam onto one of the walls of the CAVE [Fig 116]. They had no choice as to which wall; it was allocated according to a queue system. The work was not immersive for those who accessed it through the Internet.

The immersants within the CAVE could only communicate with one webcam stream at a time, meaning that the two-way audio that facilitated verbal communication would only be active for one of the walls at any given moment [Fig 117]. This active wall was randomly assigned and the immersants were unable to choose who they communicated with. The other Internet participants thus became observers.

During the exhibition run of the installation, the work was documented on a 24 hour basis as a series of still images. There were two still images were captured every 15 minutes, one depicting the inhabitants of the CAVE and another with a view of the webcam that was communicating at that moment. At the time of writing, the images from the final day that the installation was exhibited (20 November 1999) can still be viewed online¹⁰.

Crossing Talks physically situated viewers within the sort of cyberspace popularised by websites such as Chatroulette¹¹ and Omegle¹², albeit a decade earlier. They enact a sort of hyper-chat, facilitating rapid-fire random webcam chat pairings across the globe, the whole point being to create anonymous exchanges between distributed individuals. The "Talk to Strangers!" slogan adorning the Omegle homepage emphasises this (2012). The twist in *Crossing Talks* was that if the immersants failed to communicate amongst themselves in the immediate proximity of the CAVE, the CAVE environment became unstable and tilted like a life raft. Or at least this is how it appeared to the immersants. When this occurred, the projections shifted to create the impression of veering towards capsizing. For the immersants, this effect was enhanced by the stereoscopic glasses.

According to Benayoun, "When survival is at stake, communication that is not influenced by the media becomes a marked necessity" (2003a: 580). The point is that while conversing with the webcam streams may appear to create the illusion of proximity in folded cyberspace, this proximity is useless the moment there is a crisis that affects one's physical wellbeing. If something happens to threaten your survival, the person on the other end is powerless to assist and the reality of the separation between the two of you is made blatant. Benayoun employed an extreme example to make his point about proximity clear. His intention in emulating a crisis was to force the immersants within the physical space of the CAVE to engage with each other.

Read in this way, the life raft metaphor becomes more pertinent. The viewers have been cast adrift in a mediated

10 See: (Benayoun, 1999b)

11 See: (Chatroulette, 2012)

12 See: (Omegle, 2012)

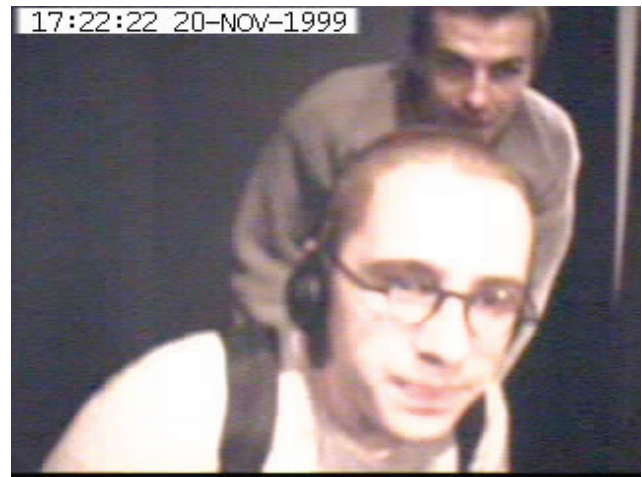


Fig 117. Maurice Benayoun *Crossing Talks Communication Rafting* (1999). View of an active webcam user communicating with the CAVE. On the left is what the webcam user sees, and on the right is the image that is projected on to the wall of the CAVE.



Fig 118. Maurice Benayoun *Crossing Talks Communication Rafting* (1999). When there were no immersants in the CAVE (in this image it is because the gallery is closed), it was still accessible from the Internet but becomes permanently unbalanced.



Fig 119. Maurice Benayoun *Crossing Talks Communication Rafting* (1999). Installation View.

sea of *faux* communication without a paddle. It is only by communicating with those in physical proximity that a sense of balance can be restored to the system and communication with the distributed participants can resume, imbued with a heightened awareness of one's physical state in tandem with the immersed dis-location in cyberspace (to use Jeffrey Shaw's term). The gesture served as a reminder that the faces being streamed onto the walls of the CAVE were not actually there; that they should not be confused with actual people as they were in fact mediated images of (actual) people.

It is in this sense that the concerns of immersed critical distance which have recurred throughout this thesis find an additional proponent in Guy Debord and the Situationist International, specifically with respect to Debord's iconic work, *The Society of the Spectacle* (1977). In this work, he famously noted that: "The spectacle is not an aggregate of images but a social relation among people, mediated by images" (1977: 1). Thus while webcam-based internet communication can create the impression of face-to-face contact, this should not be mistaken for actual proximity: "*Crossing Talks* confronts us with our relationship to others, near or far, in a saturated space of communication simulacrum" (Benayoun, 2003a: 580).

As such, Benayoun does not deny that there is some form of communication inherent in an internet-based transaction of this sort. He merely suggests that this communication is a simulacrum. As mentioned earlier, *Crossing Talks* has intrinsic aspects of Internet chat protocols embedded in its structure. The term "chat" is useful here, by definition meaning "idle or frivolous talk, prattle, small talk" ("Chat, n¹", 2012), and implying the lowest common denominator of human communication.

This "internet chat" is evident in the documentary footage of the work. A girl within the CAVE attempts to locate the active channel by gesturing and declaring: "If you can hear me, please wave like me." The short-haired female visage adorning the active wall waves accordingly and the following exchange takes place:

Active Wall:	How old are you?
Immersant:	I'm 26 years old.
Active Wall:	Cool, I'm 22. Where are you from?
Immersant:	From Japan.
Active Wall:	I'm from London. (Benayoun, 1999c)

While it is likely that much of the conversation footage was chopped in the editing process, it nonetheless draws attention to the fact that the fascination with this sort of communication is firmly rooted on the idea of two disparate live locations being instantaneously folded into one. Based on the available documentation, this appears to be a recurring conversation that perhaps results from the awkward scenario of having to converse with a complete stranger who, although depicted as being in visible proximity, could actually be located almost anywhere in the world. Communication does not tend to get much further beyond this point as somebody in the CAVE environment invariably upsets the balance of the virtual space and the immersants are sent bobbing off to the next exchange.

All possible combinations of assigned positions for each of the webcam viewers (who Benayoun refers to as "communication raftlings" (1999a)) were placed in a grid-like matrix, and it is this matrix that the CAVE-raft moved through when it is unbalanced [Fig 121]. The raft moved in the direction corresponding to which of the sides was unbalanced until the immersants rearrange their positions and balance was restored. The combination of projections located on the grid position where the raft halts will then be the new configuration of the CAVE [Fig 120]. Think of the virtual geography of the work as being akin to a large chessboard where



Fig 120. Maurice Benayoun *Crossing Talks Communication Rafting* (1999). Detail of how the work arranges the webcam streams into rooms. When unbalanced, the raft floats through the rooms until balance is restored.

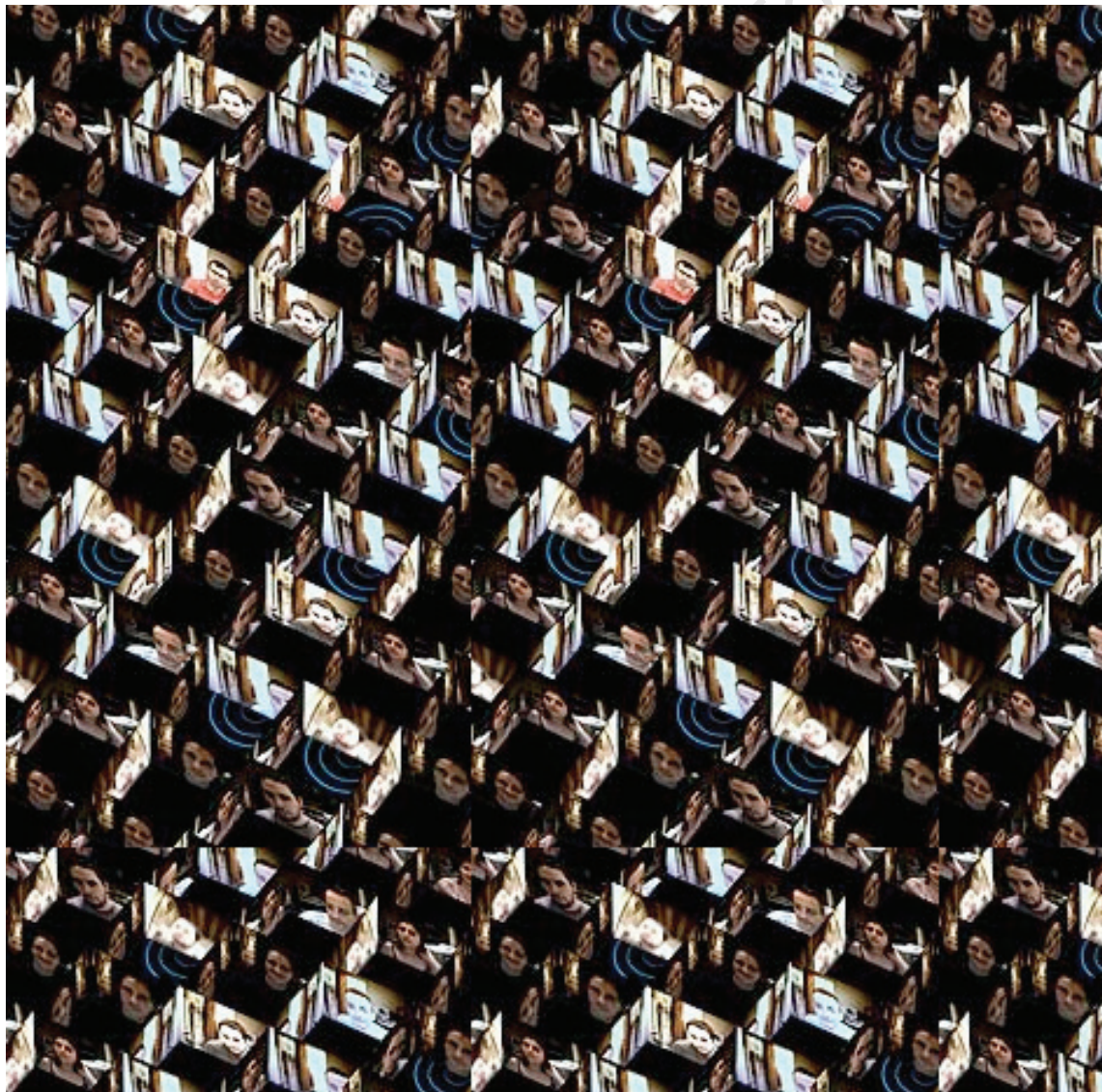


Fig 121. Maurice Benayoun *Crossing Talks Communication Rafting* (1999). The grid of communication raftlings.

each square represents a different configuration of communication raftlings. In this scenario, the CAVE would be able to move in all directions like a queen, although the direction and number of squares crossed would be determined by how unbalanced the immersants are.

As a result, the communication raftlings are placed into one of three possible roles; the names that have been assigned to these roles are my own. The first is the passive invisible, referring to those who can see into the CAVE but are not yet projected onto one of the walls and are thus invisible to the immersants. The second is the passive visible, representing those who are projected into the CAVE but are unable to communicate. Finally, there is the single active visible, referring to the individual who is able to communicate with the immersants if the life raft is balanced. These roles were all subject to change depending on the stability of the CAVE/life raft.

Benayoun had previously looked at the notion of connecting two separate global spaces together in two of his earlier, non-immersive works, entitled *The Tunnel Under the Atlantic* (1995) and *The Paris - New Delhi Tunnel* (1998). Taking the form of interactive “televirtual” installations, the former joined the Contemporary Art Museum in Montreal with the Centre Pompidou in Paris, while the latter joined Paris and New Delhi. Installed in each physical location was a large section of pipe that seemingly emerged from the ground. Inside of this pipe was a screen that filled the full circumference and displayed the people located on the other end [Fig 122-123]. “The tunnel enabled hundreds of people from either side to meet” (Benayoun, 2003b: 578).

While the participants in *Tunnels* were restricted to those in the space of the installation, *Crossing Talks* opened the floor to anyone who was able to connect to the internet and stream their image via a webcam. Interestingly, seventeen years after the first *Tunnel* work, Benayoun has recently resurrected the series now that “it is technically possible to think about creating the whole project as it was conceived and imagined” (Benayoun, 2012).

Co-commissioned by ZERO1 Biennale and Media City Seoul 2012, *Tunnels Around the World*¹³ (2012) has tunnels linking the School of Creative Media in Hong Kong with Media City Seoul 2012; ZERO1 Garage, San Jose; La Société des Arts Technologiques; and Montreal and Parsons New School of Design in New York. Benayoun promises that “After this experimental event, *Tunnels Around the World* will run on the Internet so thousands of people can participate at the same time” (2012).

Christa Sommerer, Laurent Mignonneau and Roberto Lopez-Gulliver - *The Living Web*

Christa Sommerer, Laurent Mignonneau and Roberto Lopez-Gulliver also presented a CAVE-based immersion into cyberspace in *The Living Web* (2002). Intended as an alternative to the “standard fashion” by which most World Wide Web browsers function (Animax Multimediatheater, 2002), *The Living Web* presents the process of web-browsing as an immersive, communal experience within a virtual environment; an inhabitable Web. The work has moved the process of web-browsing one step closer towards becoming a fully immersive experience

The Living Web was unveiled at the 2002 ‘Art of Immersion Media Festival’ in Bonn, Germany. In the work, media such as images and sounds are streamed from the World Wide Web into the CAVE and appear to float within the space. The images are set against a solid black backdrop that creates the impression of being located within an infinite “mediaspace”. Intended for the simultaneous immersion of multiple viewers, the nature of the media is determined by microphones that recognise keywords in the immersants’ conversations and subsequently download new image and sound files accordingly. The work is therefore dependent on the presence of people communicating to generate its content.

13 See: (Benayoun, 2012b) for a full project description.



Fig 122. Maurice Benayoun *Tunnels Under the Atlantic* (1995). Installation view.



Fig 123. Maurice Benayoun *Tunnels Under the Atlantic* (1995). Installation view.

Referring back to the discussion in the previous chapter, *The Living Web* marks another example of a work in which the viewers are very much responsible for collaboratively authoring the content of their experience. Having more than one individual in the CAVE significantly enhances the content, given that speech is a prerequisite for focusing the types of images that are called-up by the work. Isolated immersants run the risk of mimicking the “Computer, launch program *Chapter 4*” lines made famous in *Star Trek* when instructing the ship’s computer to execute Holodeck programs.

The artists described *The Living Web* as a “novel system for intuitive, immersive and entertaining information creation and retrieval” (Sommerer, Mignonneau & Lopez-Gulliver, 2002). Interaction with the floating data is achieved using an interface designed to resemble a pair of tweezers [Fig 125]. Pertinent data is extracted by “grabbing” it with the tweezers and then placing it “in 3D space to bookmark it and sort the various selected icons as 3D bookmarks to create further links, weights of interests and connections between the various topics selected” (Stocker; Sommerer & Mignonneau, 2009: 189). Web browsing thus becomes an act of lepidoptery. In grabbing an image, further information such as the image’s URL can also be accessed.

Like the Voiceholders that immersants could use to leave messages in Brenda Laurel and Rachel Strickland’s *Placeholder* (1993), the immersants in *The Living Web* interact with the virtual environment and leave it in a modified state. Immersants in *The Living Web* create bookmarks and isolate specific images of interest, collaging them in a manner pertinent to that particular group of people. Upon entering the space, the results of the previous immersants’ session serve as the catalyst of the new immersants’ venture into the “living web”.

It is in this respect that the connections to Guy Debord and the Situationists (mentioned in relation to *Crossing Talks*) can be extended in order to argue for *The Living Web* as a sort of immersive Internet-based *dérive*. The parallels between *The Living Web* and the *dérive* as a “technique of rapid passage through varied ambiances” that involve “playful constructive behaviour and awareness of psychogeographical effects” (1956) are highlighted by Sommerer and Mignonneau, who describe their work as:

useful tools for visual and intuitive browsing through large and complex amounts of image and sound data, and they are especially suited for untrained users who do not look for any specific information but just want to browse through large amounts of data or discover new and unexpected images and sounds (Stocker, Sommerer & Mignonneau, 2009: 189).

Both the *dérive* and *The Living Web* rely on passages/navigation through fluctuating environments that are motivated by intuitive response. Debord suggests that this intuition is motivated by “psychogeography”, which he had previously defined in *Introduction to a Critique of Urban Geography* as “the study of the precise laws and specific effects of the geographical environment, whether consciously organized or not, on the emotions and behaviour of individuals” (1955). In other words, both the *dérive* and psychogeography emerge as a reaction to the specific environment one finds oneself in and its contents:

The World Wide Web...offers us the opportunity to waste time, to wander aimlessly, to daydream about the countless other lives, the other people, on the far sides of however many monitors in that post-geographical meta-country we increasingly call home (Gibson, 1996: 196).

While it is not a huge stretch to define *The Living Web* in terms of “rapid passages through varied ambiances”, it is more immediately difficult to envision it as a “geographical environment”. However, as discussed throughout this thesis, to state that a computer-generated environment is immersive is to imply that the computer-generated environment gives the impression of *being within it*; that it creates a sense of an inhabitable space.

In his highly-influential 1991 essay, *Liquid Architecture in Cyberspace*, Marcos Novak famously stated that:

“Cyberspace *is* architecture; cyberspace *has* architecture; and cyberspace *contains* architecture” (Novak, 1991: 226). Discussing an immersive model of cyberspace, Novak’s argument emphasises the “space” component of the term. His point is that immersive cyberspace is defined as an artificial space that can be entered. Consequently, it needs to be designed and constructed. Thus, “More than asserting that there is architecture within cyberspace, it is more appropriate to say that cyberspace cannot exist without architecture, cyberspace is architecture” (Novak, 1991: 243).

Unintentionally (as it predates the work by eleven years), Novak provides a rather poetic description of *The Living Web* in the following declaration:

I am in cyberspace. I once again resort to a freer writing, a writing more fluid and random...I seek the colour of being in a place where information flies and glitters, connections hiss and rattle, my thought is my arrow. I combine words and occupy places that are the consequence of these words...Now I can mix the words of different media and watch the meaning become navigable, enter it, watch music and magic merge (Novak, 1991: 229).

Extending Novak’s allusions to magic, the process of materialising images and sound files within the virtual space through stating their names is imbued with the sense of being a sorcerous act of summoning. Viewing the images’ animated existence within the space, emerging from some indefinite point and floating off towards another, is ultimately what creates the impression of depth within the work, however vast and seemingly infinite this space appears to be.

Debord’s writings are heavily laden with political intent, and it must be stressed that there is nothing in the creators of *The Living Web*’s statements to suggest that there should be any political angle in the reading of the work. However this does not detract from it being a useful area of inquiry. Rather than being a “social relation among people, mediated by images” (Debord, 1977: 1), *The Living Web* becomes a social relationship among people mediating images: “One can *dériver* alone, but all indications are that the most fruitful numerical arrangements consist of several small groups of two or three people who have reached the same level of awareness” (Debord, 1956).

The point is that translating the navigation of the Web into an immersive experience heightens the psychological connection to the content. Hypertext gives way to hypermedia.

Hypermedia takes us even closer to the complex inter-relatedness of everyday consciousness; it extends hypertext by re-integrating our visual and auditory faculties into textual experience, linking graphic images, sound and video to verbal signs. Hypermedia seeks to approximate the way our waking minds always make a synthesis of information received from all five senses (Landow & De Lany, 1991: 227).

In the words of Margaret Wertheim: “We have yet to realise the full VR splendour of Gibson’s original vision, but the essential concept of a global data space is already manifest in the World Wide Web” (1999: 301). The next step is to progressively find ways to introduce this “full VR splendour”. While *The Living Web* marked a full-bodied, immersive experience of navigating online content, the content itself remained two dimensional.

In *Transmitting Architecture: The Transphysical City*, Marcos Novak refers to a three dimensional browser called Webspaces that was integrated into Netscape, then the “most widely used WWW browser” (1996). “Webspaces creates the first widespread opportunity for the transmission and exchange of virtual environments” (Novak, 1996). Unfortunately any other references to this browser seem to have vanished altogether.

There have been numerous vehicles for transmitting and exchanging virtual environments online since, such as Virtual Reality Modelling Language (VRML), Active Worlds, Distributed Interactive Virtual Environment



Fig 124. Christa Sommerer, Laurent Mignonneau and Roberto Lopez-Gulliver *The Living Web* (2002). Installation view.



Fig 125. Christa Sommerer, Laurent Mignonneau and Roberto Lopez-Gulliver *The Living Web* (2002). The green lines are the virtual representation of the tweezers that immersants use to interact with the images.



Fig 126. Christa Sommerer, Laurent Mignonneau and Roberto Lopez-Gulliver *The Living Web* (2002). The work derives search terms for new content from the conversations that take place between immersants.



Fig 127. Christa Sommerer, Laurent Mignonneau and Roberto Lopez-Gulliver *The Living Web* (2002). Installation view.

(Dive), WebOOGL and current standard, Extensible 3D (X3D)¹⁴. This list is by no means definitive, but it suffices to show the existence of the move towards the creation and dissemination of three dimensional virtual environments on the Web.

John Fillwalk - *Survey* and *Flickr Gettr*

This brings us to the final project that will be discussed in this chapter. 15 March 2012 saw the inauguration of the Virtual Broad Art Museum (VBAM). As the name implies, the VBAM is tied to the Eli and Edythe Broad museum which was officially opened 9 November 2012 at the Michigan State University campus in East Lansing, Michigan. Inaccuracies in the glass panes required for Zaha Hadid's complex designs for the Eli and Edythe Broad museum resulted in a delay in the construction of the physical building, and VBAM was launched in the interim (Medina, 2012). The gallery building in the virtual world is an exact virtual replica of the physical building [Fig 128-129].

Museum director Michael Rush explains the motivation behind the virtual museum thus:

What I really wanted to do is get a museum up as quickly as I could, but a museum that announced our internationalism and desire to participate in the 21st century. I thought the best way to do that would be to initiate a digital experience that would be available worldwide, involve multiple users, and reflect the real building, but in a virtual world (Zara, 2012).

VBAM launched with a selection of four different installations by “intermedia” artist John Fillwalk and *dis|PLACE* (2012), an interactive gesture-based performance which only took place during the opening reception. The focus in this discussion will be on two of the accessible installations, *Survey* (2012) described as an “immersive landscape simulation”, and *Flickr Gettr* (2012). Upon selecting an installation to enter, viewers in the VBAM are required to adopt one of the pre-determined avatars. The choice is between a male or female avatar in uniform black or white¹⁵. The only installation out of the four to deviate is *Proxy* (2012), whose avatars are primary coloured cubes. Each viewer is also required to assign their avatar a name in order to bestow them with a specific identity within the virtual environment; there are a very limited number of avatars available and without names there would be confusion due to duplicates. All four works are built to run using the Unity 3D Webplayer plug-in.

As mentioned above, Fillwalk's *Survey* is labelled as an immersive landscape simulation. The full description of the installation is as follows:

An immersive landscape simulation, *Survey* uses real time weather data from the physical location of the Broad Art Museum in East Lansing, Michigan. Representations of surveyor's tape, flags, and clouds are superimposed onto the virtual landscape in accordance with the real-life data, which informs wind speed and direction, time of day, and cloud density in the digital environment (Michigan State University, 2012).

While the virtual museum itself is fully navigable, it is largely incidental to this particular work as the environmental shifts take place in the exterior virtual landscape surrounding it. In this landscape, expansive lengths of oversized orange surveyor's tape stretch out perpendicular to the museum building, with purple flags scattered in between. Both the tape and the flags blow in the wind, moving across the landscape and passing through any physical object (be it the viewer's avatar or the building) that might lie in their path.

14 See: (Web3D Consortium, 2012) for detailed discussion about the current move towards the creation of open standards for Web3D specifications.

15 There was the option of selecting a grey avatar as well, although at the time of writing, this seems to have been removed sometime between the 14 and 15 November 2012. It may well have been restored since.



Fig 128. The Eli and Edythe Broad Art Museum as it exists in physical reality on the Michigan State University campus...



Fig 129. ... and as it appears in the online virtual environment.

As mentioned in the quotation above, the weather conditions correspond to those of the physical Broad Museum's East Lansing surrounds. The most obvious shift is from day to night, represented by the colour of the sky and the position of the sun; both transitioning over a 24 hour period¹⁶ [Fig 130]. Wind speed and direction are represented by translucent streams of triangles that blow across the ground at the appropriate speed and direction. The wind also affects the tape and flags, causing them to billow and twist. The density of clouds in the sky is also coherent with the real-time weather conditions.

Survey was invariably going to have a difficult time fulfilling its claim of being immersive (at least according to the definitions used in this thesis), given that in most cases it would be displayed on a computer monitor, meaning that everything outside of its frame may creep in. As a way around this, one could project it onto a wall in a darkened room. "Wall-sized projections [...] can merge remarkably seamlessly with physical reality by presenting images at life size and extending them to the edges of the viewer's peripheral vision. Myron Krueger's *VIDEOPLACE* project first convincingly demonstrated this possibility" (Mitchell, 1999: 39). Viewing it through video glasses¹⁷ is another alternative.

This highlights one of the main difficulties of exhibiting a work over the Internet, which is that the artist has no control over the means by which the work is displayed. The contrast between viewing *Survey* on a dusty old 12-inch Cathode ray tube monitor in comparison to a wall-sized high definition projection is obviously going to be substantial and affect the immersive potential of the work. The same goes for Internet connection speeds (or the lack thereof).

Survey's potential for immersion is, however, also marred by a factor that the artist had control over, namely the movement of the avatar. The viewer's avatar is seen from a third person perspective where a first person perspective would have been more effective. The problem comes down to the fact that the computer mouse controls the "camera angle" of the view, while the keyboard controls the avatar. The result is that the viewer simultaneously has control of two completely different and separate aspects of the virtual environment: the angle at which it is viewed, and the movement of the avatar within it. The fact that the camera angle can be shifted so that the avatar is "looking" directly at the viewer who it is supposed to stand for as a surrogate, is a jarring experience that serves to dissociate the viewer even further from the avatar. This is especially disorientating in circumstances where the mouse has been substituted with head tracking.

Had the work been viewed from a first person perspective, the viewpoint of the avatar would have matched the viewpoint of the viewer, resulting in a greater level of synchronicity and hence, empathy. Much like the digitised mannequin in Agnes Hegedüs, Berndt Lintermann and Jeffrey Shaw's *reConFiguring the CAVE* (2001), the dissociation of the viewer from the avatar leads the avatar to read like a puppet rather than an extension of themselves. "The decision of whether to employ a first-person or third-person perspective alters factors such as whether we watch a more distanced character [...] or play from within a character with whom we have a more immediate relationship" (Bryce & Rutter, 2002: 71). Clearly if the intent of immersion is to make the immersant feel present within the virtual environment, then that "more immediate relationship" is crucial.

This is not to suggest that *Survey* is entirely unsuccessful. One area where it is effective is the audio component and to this extent, credence is given to Brenda Laurel's assertion that "High quality audio makes people perceive

16 As *Survey* applies the local time, the work is seven hours behind South Africa when East Lansing is not in Daylight Savings Time.

17 The route that I have tried, using Vuzix Wrap 920 VR glasses and equipment for head-tracking. The limitations of video glasses will be discussed in the conclusion.

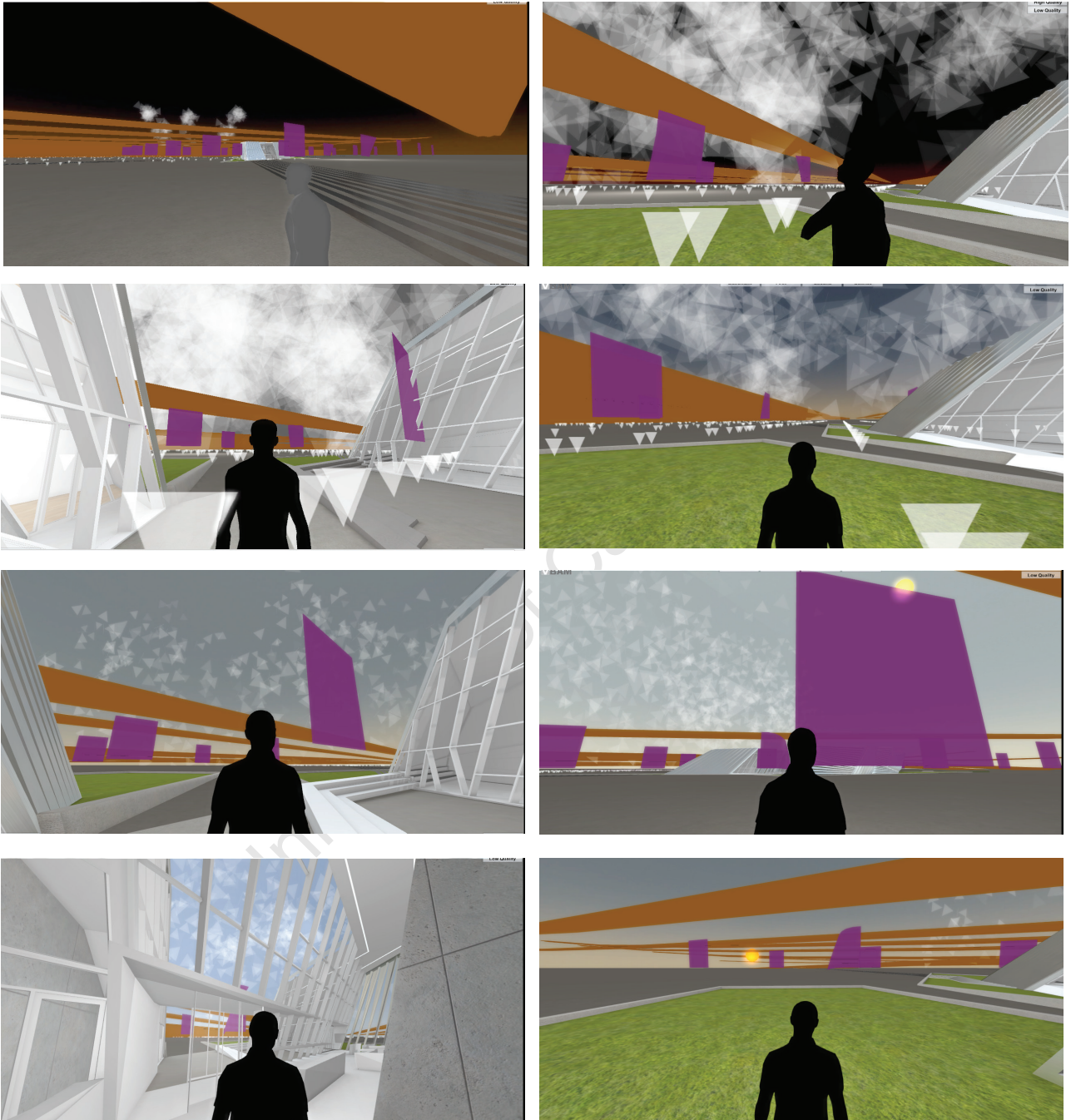


Fig 130. John Fillwalk Survey (2012). A day in the life of Survey. The virtual environment goes through real time changes in weather and the shift from night to day, corresponding to the conditions at the museum's physical location.

visual displays to have higher resolution, while the converse is not true” (Laurel, 1993: 207). The sound is spatialised and effective in conveying the direction in which the wind is blowing and at what strength. Interacting with the work while wearing headphones creates the impression of being in a wind tunnel or on an airport runway. The surveyor’s tape gives off a hum that becomes increasingly loud as it approaches. This hum reaches its apex when passing through the viewer, before fading away again as the tape moves off into the distance.

Interaction with the work is limited to moving around and exploring the virtual environment, although if any other avatars are encountered they can be engaged with and chatted to. On this note, we are reminded on the VBAM’s webpage that “Before logging into the Virtual Broad Art Museum, keep in mind that this is a public space, so treat those around you with the same respect as you would at the art museum itself” (Virtual Broad Art Museum, 2012a).

The other work that will be discussed briefly, *Flickr Gettr* has been included because it raises a key point regarding *The Living Web*. In a sense, *Flickr Gettr* is conceptually akin to *The Living Web*. Viewers enter specific search terms which are then input into the online photo sharing website, Flickr. The results of the search are pulled into the virtual environment and float through it in a manner very similar to *The Living Web*, although they cannot be interacted with [Fig 131-132]. With the results of each search, a series of suggestions for related searches are also listed.

What is important is the fact that the work specifies the source of the images, i.e. Flickr, unlike *The Living Web*, which merely states that image and sound files are downloaded “from the Web” (Sommerer, Mignonneau & Lopez-Gulliver, 2002). As discussed earlier, describing entities such as the Web or cyberspace as homogenous is problematic due to their conjunctive nature. If cyberspace (as Marcos Novak suggested) *is* architecture, then the search engine utilised is the map that decides, via its own agenda, where the spot that X marks is.

An unfortunate choice in the design of *Flickr Gettr* is that even though many users can be located in the virtual environment at the same time, each user can only see his or her own Flickr searches. This effectively curbs any potential to facilitate collaborative interaction between users.

Virtual Broad Art Museum may seem like an easy target for criticism and not worth consideration, but this all depends on how seriously the directors intend to follow up on their stated plans for it. These plans suggest that the VBAM “will have its own schedule of programming independent from the actual museum, complete with performance art and lectures” (Zara, 2012). Michael Rush has further suggested that “With the Virtual Broad Art Museum, we have an opportunity to embrace the tremendous creative and connective possibilities that exist in the digital world” (Institute for Digital Intermedia Arts, 2012).

He is not incorrect in this assertion. There is plenty of potential demonstrated in John Fillwalk’s selection for the VBAM. Based purely on the works “on show”, the VBAM has the potential to facilitate full-bodied interaction between multiple participants in a distributed, responsive online virtual environment and to disseminate immersive virtual art through cyberspace. Furthermore, information from physical reality (such as the environmental conditions in *Survey*) and from the broader World Wide Web (such as the images that are pulled in via *Flickr Gettr*) can converge in this cyberspace.

Earlier, the issues with the avatar movement system and its hampering effect on the immersive potential of *Survey* were noted. In contrast, *dis|PLACE* (2012), the interactive gesture-based performance created by John Fillwalk with Neil Zehr and Jonathan Strong for the opening event of VBAM, involved the direct translation of a participant’s body movements into the virtual world through a Microsoft Kinect sensor. This is a far more



Fig 131. John Fillwalk *Flickr Gettr* (2012).

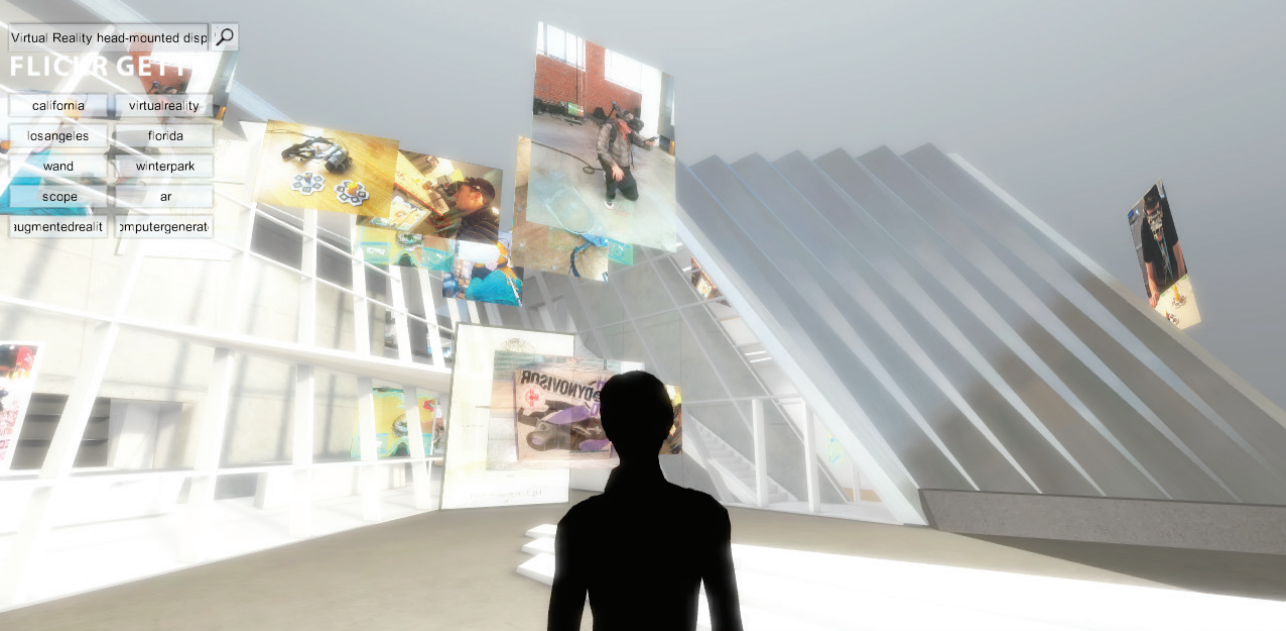


Fig 132. John Fillwalk *Flickr Gettr* (2012).

effective means of facilitating an immediate relationship with the virtual environment. Reflecting a viewer's own body movements the virtual environment goes a long way in creating the impression of a sense of presence within it, especially if represented from a first-person perspective. If immersion is the desired goal, then the refinement of the movement system is essential.

These points are not necessarily exclusive to VBAM—there are plenty of virtual galleries operating within online virtual worlds such as *Second Life*¹⁸ for instance—but VBAM was selected because it provides a fitting bookend to the discussion when considered alongside 'Virtual Reality: An Emerging Medium', discussed in Chapter One.

'Virtual Reality' functioned as the first exhibition to deal with virtual reality within an American art museum (Ippolito, 1993: 1), while the Virtual Broad Art Museum is directly tied to a major art museum and serves as the first online virtual gallery to exhibit *original content* instead of reproducing its existing collection (which is the focus of undertakings such as the Google Art Project¹⁹). While immersive virtual reality is still very much an emerging medium, visually the works in the VBAM are already far more graphically complex than anything that 'Virtual Reality' had to offer in 1993, and the audio component is highly effective in conveying a sense of being within a spatialized environment. Therefore it is not unreasonable to suggest that the VBAM could facilitate a fully immersive experience in cyberspace in the future.

The effective dissemination of immersive virtual reality installations through the cyberspace of the World Wide Web (and the Internet in a broader sense) would be a significant move towards achieving what Margaret Wertheim earlier termed, "the full VR splendour of Gibson's original vision" (1999: 301). If artists continue to use equipment that can translate bodily gestures into the virtual environment such as the Microsoft Kinect sensor, we may even get to hang on to our "meat" in the process.

18 Sasun Steinbeck's *Art Galleries of Second Life* directory has a listing of 475 galleries that are currently in virtual operation (2012).

19 See: (Google Art Project, 2012)

CONCLUSION

HOMEWARD BOUND

I think working with VR gives you a prayer of keeping up with what will be in everyone's house, of getting some kind of toe-hold, and of having some impact into what VR will become.
- Jenny Holzer (Cirincione, 1992b: 28)

Largely prompted by the hype that declared virtual reality as “the ‘Big Idea’ of the 1990s” (Woolley, 1992: 16), immersive virtual reality art was initially propelled by the view that the onset of virtual reality technology into the home environment was imminent. Consequently there was a move to solidify artists’ role in shaping the technology’s development. The intent was to define an artistic medium that was distinct from the perception of the technology that was informed by “media hysterics and the stigma of violent video games” (MacLeod, 1996: x). When it became clear that virtual reality (as depicted in science fiction) was not going to be “out by Christmas” and turning a profit, the technology itself was put on the backburner, leaving behind the media hysterics and violent video games to drive the medium forward. The former subsided while the latter has persisted.

But as this thesis has shown, artists have continued to work with this medium undeterred. Rather than a grandiose and instantaneous virtual reality revolution, the technology has grown and developed subtly in small increments, mostly through personal computer and videogame technology. In the introduction to this thesis, it was suggested that the initial immersive virtual reality project may have been ahead of its time, prematurely attempting to claim and shape a technology that was far too malleable and undefined. It was also suggested that in the current context of 2012, artists find themselves in a far better position to realise the immersive virtual reality art project as it was initially conceived, and the underlying concerns of the 1990s remain just as relevant now, if not more so.

In terms of these claims, it is encouraging to note some of the developments that have taken place in the two years since this research was initiated. Judging by these developments, it would appear that Michael Heim’s assertion of CAVE and HMD as “the two main doors of virtual reality today, at least in the strong sense of the term” (1998: 27) continues to be the case, and will be for a while to come.

One of the more curious developments stems from a patent application filed by Microsoft on 2 March 2011 (published by the United States Patent Office on 6 September 2012) which details a CAVE-like “immersive display experience” (Perez, 2012). Intended for home use, the system is described as an “interactive computing system configured to provide an immersive display experience within a display environment [...] wherein the peripheral image is configured so that, to a user, the peripheral image appears to surround the user when projected by the environmental display” (Perez, 2012).

The idea essentially is to have an immersive video game system where the game environment is projected in a manner that surrounds the gamer(s). In agreement with my view in the previous chapter that display on a screen hinders the immersive effect of media due to the screen’s framing constraints, Gritsko Perez (the author of the patent application) writes in the “Detailed Description” section of the patent application that:

Interactive media experiences, such as video games, are commonly delivered by a high quality, high resolution display. Such displays are typically the only source of visual content, so that the media experience is bounded by the bezel of the display. Even when focused on the display, the user may perceive architectural and decorative features of the room the display is in via the user’s peripheral vision. Such features are typically out of context with respect to the displayed image, muting the

entertainment potential of the media experience. Further, because some entertainment experiences engage the user's situational awareness (e.g., in experiences like the video game scenario described above), the ability to perceive motion and identify objects in the peripheral environment (i.e., in a region outside of the high resolution display) may intensify the entertainment experience (2012).

Based on the supplementary illustrations, the final product (should it be released) may end up occupying the middle-ground between CAVE and HMD. It would appear that the gamer will be able to physically move about the room as with a CAVE system, but they will also be represented within the game environment by an avatar [Fig 133]. This is suggested by the presence of the gun avatar (the hallmark of the First Person Shooter genre of video games) on the television screen in the diagram. Presumably this would be for online multiplayer games, where the player would need to be represented visually for the other players, as nothing would break the immersive effect of a game quite like someone running across a futuristic science fiction battlefield in jeans and a t-shirt. It is also far easier to track specific parts of the gamer's body than to translate an entire image of the body into the virtual environment. Perhaps the most important aspect of this product is that the immersed gamer's full physical body will be used in navigating the virtual game worlds; a genuine embodied experience.

With respect to HMD, a spinoff of the current 3D cinema boom (which has spilled over into home devices such as 3D high definition televisions and 3D Blu Ray players) has been that corporations like Sony have given HMDs another try as a viable personal media device. The intent is for the HMDs/personal 3D viewers to provide users with an isolated experience of watching 3D content similar to the experience of listening to music using the Walkman or portable mp3 player. In late November 2011, Sony released the HMZ-T1 Head Mounted Display, which has recently been succeeded by the HMZ-T2¹. The device description encourages users to "immerse [themselves] in 'personal theatre' excitement with spectacular big-screen viewing and sensational surround sound anytime and anywhere at home" (Sony South Africa, 2012). Sony's foray into personal 3D viewers joins the growing list of commercially available video glasses that includes the Vuzix Wrap 1200VR and Zeiss cinemizer OLED.

In reality, these devices are not true HMDs in the immersive sense. The immersive effect is limited by the fact that rather than enveloping the wearer's field of vision, the screens inside these devices strive to emulate viewing a 3D HD television set from a distance². While they can be used for gaming (where they would serve interactive purposes as well), the Vuzix Wrap 1200VR is the only headset to include the head tracking required for this; the others require the purchase of additional accessories.

In contrast to these devices, one of the most exciting pieces of upcoming technology from an immersive perspective is the Oculus Rift HMD [Fig 134]. Rather than bandying "immersion" as a marketing term, the Oculus Rift has been developed with the primary goal of successfully achieving an actual immersive experience:

Most consumer Head Mounted Displays have a diagonal field of view of about 30°- 40°. You see a really small image way off in the distance and it doesn't make you feel like you're there. With the Oculus Rift you get a diagonal field of view of 110°. That means that you're not looking at a screen any more, you actually feel like you're inside the world (Oculus VR, 2012).

1 At present this model has only been released in Japan.

2 Sony's HMZ-T1 has a 40° field of vision and emulates viewing a 75 inch screen from 2 meters away (Sony South Africa, 2012). Vuzix's Wrap 1200VR has a 35° and resembles a 75 inch screen from 3 meters (Vuzix, n.d.). The Zeiss cinemizer OLED is the lesser of the three devices and has a 30° field of vision, resembling a 40 inch screen viewed from 2 meters (Zeiss, n.d.).

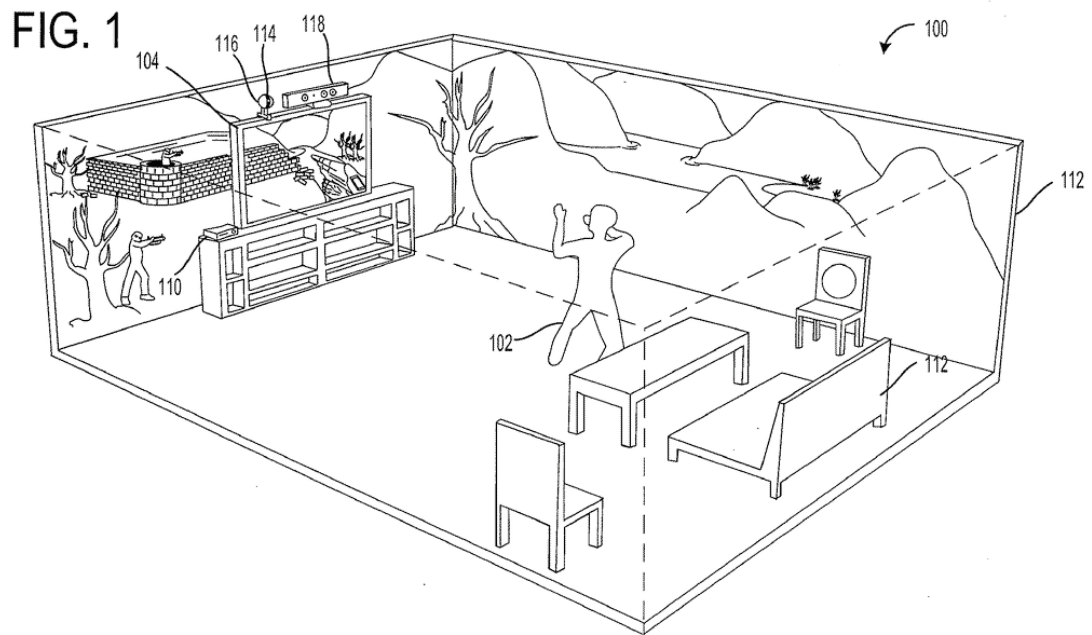


Fig 133. Diagram attached to Microsoft's patent application depicting the proposed system.



Fig 134. Oculus VR's upcoming Rift HMD.

Designed for use in video games, the intent of the Oculus Rift is to facilitate a fully immersive, affordable experience of the video game's world: "What the rift does is take a high end virtual reality system and make it available to the average gamer" (Oculus VR, 2012).

Oculus VR launched a Kickstarter³ on 1 August 2012 with the goal of raising \$250,000 to help with the initial commercial production of the HMD. When the Kickstarter closed on 1 September 2012, a total of \$2,437,429 had been raised (Kickstarter, 2012). The fact that Oculus VR was able to garner nearly ten times the amount than it was aiming for in the space of a month, certainly suggests that there is still plenty of interest in immersive virtual reality as an entertainment medium. The difference between the 1990s and the present is that this interest is being directed towards equipment that actually exists, and that is commercially feasible.

The reason that the Rift is especially exciting is that Oculus VR have made the Software Development Kit (SDK) easily available if one preorders the Oculus Rift Developer Kit. This version of the product will be shipped with the software required to develop virtual environments for use with the system. In other words, there is little to stop an aspiring immersive virtual reality artist from purchasing the relatively inexpensive⁴ Developers Kit and setting to work on their immersive vision. It is not clear whether this will be the case with Microsoft's patented product.

Rather than relying on expensive technology on loan from institutions with vested interests, the above shows that artists now have the capacity to produce immersive virtual reality works using highly effective technology that is readily available to them. This may be at odds with MacLeod's call for artists to no longer be "grateful users of borrowed tools" (1996: ix), but perhaps his aspirations for artists to drive the direction of virtual reality's technological development were unrealistic. The adjective "borrowed" should be dropped, and the technologies should be simply viewed as tools.

Artists such as Brenda Laurel and Char Davies will more than likely be exasperated by the fact that in the case of both the Rift and Microsoft's patent application, the technology is being marketed as enhancing the level of immersion for First Person Shooters. In Microsoft's case, the diagram in the patent application is indicative of a First Person Shooter (Perez, 2012), and in Oculus VR, id Software's *Doom III: BFG Edition* (2012) is shipped as part of the Developer's Kit; "the first Oculus-ready game" (Oculus VR, 2012) [Fig 135].

While interactivity in many commercial computer games does indeed revolve around "adrenaline-producing high-speed action and aggression"⁵ (Davies, 2002: 417), this does not change the fact that many people experience their first interaction with a virtual world through video games. Declaring that she "[abhorred] the violent content that is characteristic of mainstream computer games" (1993: 167), Brenda Laurel nonetheless quotes game designer and researcher Chris Crawford's observation that:

Computer games have been in the forefront of 'friendly' interface design, being the first consumer computer applications to employ such techniques as multisensory representation, kinaesthetic input and tight coupling of kinaesthetic and visual modalities, speech and other auditory output, and first-person point of view (1993: 168).

3 An online fundraising platform which allows anyone with a credit card on the internet to pledge financial support towards the development of the project being "Kickstarted".

4 The differences in cost are significant. A pre-order for the full Rift Developer kit costs \$300, while the Sony HMZ-T1 costs \$799.99, the Zeiss cinemizer OLED, \$749.00, and the Vuzix Wrap 1200VR, \$599.99.

5 This is certainly a generalisation, but going further lies outside of the scope of the current discussion. For example, all 14 of the video games that MOMA has recently acquired for their collection and exhibition in March 2013 constitute exceptions to Davies' assertion (see: Antonelli, 2012).



Fig 135. id Software's *Doom III: BFG Edition* (2012): The first Oculus-ready game.

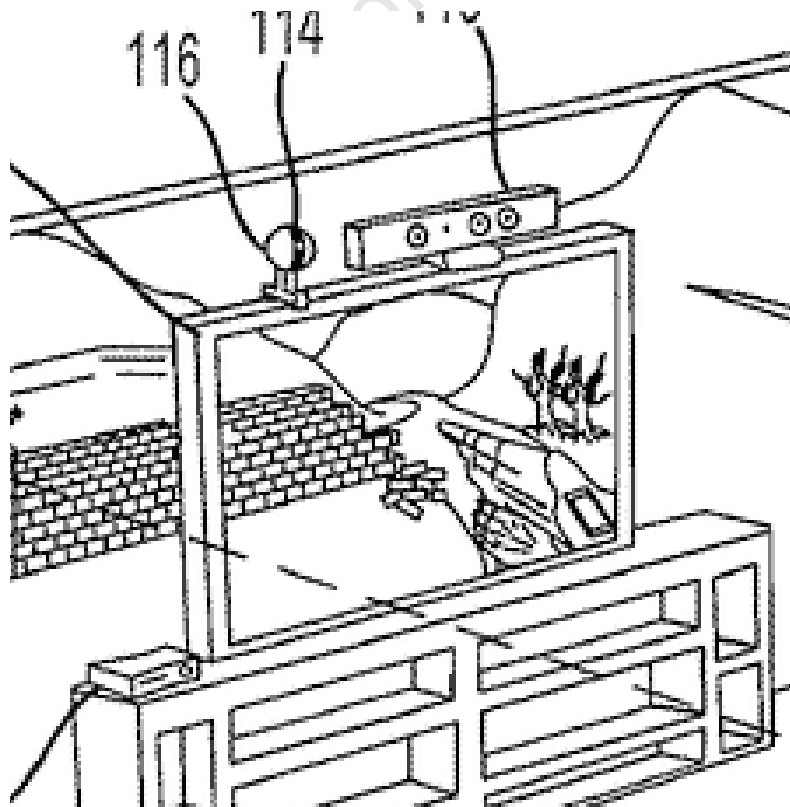


Fig 136. Detail from the Microsoft patent application. Note the similarity between the game depicted on the screen in the application and Fig 133.

The video game industry will continue to spur on the development of virtual reality technology, as it is the video game industry that consistently generates revenue.

It is very important to understand that virtual space is not neutral. The origins of the technology associated with it lie deep within the military and Western-scientific-industrial-patriarchal complex. It should not be surprising then if the medium not only reflects these values but, by default reinforces [them] (Davies, 2004: 72).

This only serves to emphasise the need for artists to continue to work with the medium in order to provide alternative approaches to the experience of virtual environments. This was a fundamental driving force behind Char Davies' earlier immersive virtual reality works, and one that she looks set to continue. Davies suggested in the conclusion of her 2004 essay *Virtual Space* that she was "beginning a new work in immersive virtual space, and [considers] *Osmose* [1995] and *Ephémère* [1998] as only early steps in what [she] hopes to accomplish with the medium" (103). Email correspondence with Tanya Das Neves (Assistant to Char Davies and Managing Director of Immersence Inc.) reveals that "She is indeed, working on a project but it is still in the early conceptual phases and no information is yet available for the public" (Das Neves, personal communication 2012, October 10).

If the Oculus VR Rift (or any other similar device) were to be established as an industry standard, it would be excellent news for both the exhibition and conservation of immersive virtual reality artworks. With reference to the pieces that made up the 'Art and Virtual Environments Project', Douglas MacLeod observed:

Many of these works will never be shown again. Some are simply too complex to remount. In other cases, the team of artists and programmers that produced the piece has dispersed, taking with them detailed knowledge of the assembly and installation of a particular work (1996:xii).

What MacLeod means is that in 1994, the complexity of the hardware required to run the works in the 'Arts and Virtual Environments Project' necessitated the original team being present to install the work and to attend to technical glitches. In the event that someone wished to purchase a work, they would have had to purchase the many computers running different components of the work. This not only rendered the works largely unsellable, but also meant that they were extremely difficult to conserve, especially because the equipment was usually on loan. With standardised hardware, the task of purchasing and/or preserving virtual works becomes far easier.

This is not to suggest that artists discontinue their own individual takes on immersive virtual reality. The fact that virtual reality was relatively undefined in the early 1990s resulted in artists having to work out solutions to problems as they encountered them, leading to many of the works assuming extremely idiosyncratic approaches to virtual reality (think for example of Brenda Laurel and Rachel Strickland's *Placeholder* (1993), Blast Theory's *Desert Rain* (1999) and the influence of scuba equipment on Char Davies' take on the HMD). It would be a travesty if these kinds of innovations were lost. Rather than to discourage innovation, these new devices serve to make the prospect of working in immersive virtual reality a feasible option for a far-wider spectrum of artists.

There has already been a marked reduction in the complexity of the hardware underlying immersive virtual reality's setup along with astounding developments in what home computers are capable of. In a talk surrounding the exhibition of a single-screen projection version of *World Skin* (1997) at the V2 Institute for Unstable Media in Rotterdam (2010), Maurice Benayoun was asked by the interviewer whether he felt that the simplification of the work from a CAVE installation to the new format marked "an evolution for the 3D technology". Benayoun responded with: "The evolution is that this work that used to run on a very big Silicon Graphics Onyx, runs now on my laptop, my MacBook" (V2_Institute for the Unstable Media, 2010).

Char Davies expresses similar testimony in an interview with Nick Bailey, noting that:

In 1994-95, real-time rendering of the stereoscopic semi-transparencies in *Osmose* and *Ephémère* (along with live stereoscopic projection for an audience) required a half million dollar computer, and even then, the fastest frame-rate we could achieve was only 15-20 frames per second. Around 2003, we were able to port both works to a PC that cost less than 5K (2012).

The next logical step would be for the works to migrate to the cloud of the Internet. It does not seem unreasonable to suggest that *World Skin* could evolve into something that one could access through the Internet at home inside their “Microsoft Holodeck” (or whatever their patent application is ultimately called). In fact the shutter glasses used by *World Skin* and other CAVE-based works are proposed for use with Microsoft’s system in the patent application: “[Users] may enjoy an immersive 3-D experience using suitable headgear, such as active shutter glasses [...] configured to operate in synchronization with suitable alternate-frame image sequencing at primary display” (Perez, 2012).

Likewise, HMD-based works could be streamed from the Internet and viewed on the Oculus Rift. The Rift in fact resolves many of the issues cited in the previous chapter with regards to the Virtual Broad Art Museum. If the artists know that their work will be viewed on a Rift, then they will have a far better idea of exactly how the work will be viewed by most people. The Rift would also address the problem of how to make the works genuinely immersive.

The advertising for 3D cinema and its related home variants and the continued enhancements to the experience of video games are indicative that the idea of being immersed in a mediated environment is now far more commonplace. Rather than residing strictly within the realm of science fiction, virtual immersion has become something that is possible within the home environment. Consequently, new artworks produced in the medium can be liberated from the original hype and cliché that surrounded them and instead focus on conveying the concepts of the artists.

In addition, these artists have a far greater assortment of tools available to them. Other than the Oculus Rift, there are devices like the Microsoft Kinect Sensor or the Nintendo Wii gaming console which incorporate bodily movement into the user’s interaction with virtual worlds. There is the vastly speeded-up, increasingly media-centric cyberspace of the World Wide Web and there are a number of innovative devices such as Emotiv’s EPOC neuroheadset (mentioned in Chapter Two) that could take the medium in exciting new directions. But all this is latent potential if nobody takes advantage of it.

Allucquère Rosanne Stone observed that at the start of the immersive virtual reality project, William Gibson’s work “triggered a conceptual revolution among the scattered workers who had been doing virtual reality research for years [...enabling them...] to recognize and organize themselves as a community” (Stone, 1991: 99). Perhaps an updated version of something akin to ‘Virtual Reality: An Emerging Medium’ or the ‘Art and Virtual Environments Project’ is required to likewise inspire. Immersive virtual reality is a fecund medium and it is essential for artists to maintain a stake in how this medium is used. It would be tragic if the advances in the technology were utilised solely to enhance the uncritical video game experience of target practice.

GLOSSARY

Avatar The virtual representation of an individual within the virtual environment. In cases where a virtual environment is networked, the avatar determines how the user appears to the others in the environment. Avatars are not limited to immersive works, for instance, any video game where the gamer is represented by a specific character uses avatars (Namco's *Pac-Man* (1980) for example).

CAVE Recursive Acronym for Cave Automatic Virtual Environment. A virtual reality display system that was developed at the University of Illinois' Electronic Visualisation Laboratory. CAVE, essentially a white cube when not activated, achieves its immersive effect through between four and six rear-projected screens and a surround sound system. Viewers perceive themselves to be located within the projected images through the usage of shutter glasses that cause the images to appear to be in three dimensions.

Cyberpunk Genre of science fiction that usually takes place in a dystopic future society in which high-tech computer technology was become intertwined with all aspects of daily life. Protagonists are often computer hacker antiheroes facing-off against large oppressive multinational corporations.

Cyberspace Initially a phrase coined by William Gibson, first mentioned in his 1982 short story *Burning Chrome* and later popularised by his seminal 1984 cyberpunk novel *Neuromancer*. The term refers to the shared space that exists between globally networked computers and is not conceptually unlike the Internet. The difference is that 'Gibsonian' cyberspace or "the matrix" is accessed immersively through a cyberspace deck and is described as a 'disembodied' experience as the user leaves behind the 'meat' of their body (Gibson, 1984: 5-6). It was an idea that was key to the development of virtual reality thought and the terms 'cyberspace' and 'virtual reality' were often used synonymously and interchangeably in discussions in the late 1980s and early 1990s. The term has subsequently been subsumed into everyday language and has shed its immersive connotations in favour of being used as a term for quotidian web browsing.

DataGlove A nylon glove that is covered in sensors which allows for the wearer's hand to be reflected in the virtual environment. When worn, there will be an avatar of a hand in the virtual environment which will move in accordance with the wearer's hand. This allows for virtual objects to be grabbed and handled by the user as well as for gestures such as waving to be reflected. In some immersive virtual reality artworks, the immersant navigates through the work by pointing in the direction that they would like to travel while wearing a DataGlove. The DataGlove was developed and commercially released by VPL Research Inc. during the 1980s.

Distributed With regards to networked immersive virtual reality works, distributed means that the work is accessed from more than one separate site simultaneously. These can be located in the same exhibition space or spread across the globe. What is important is that the work is not experienced as a lone, isolated immersant but rather alongside other immersants who each have an independent viewpoint.

First Person Shooter Video game genre in which the gamer experiences the game environment through the eyes of their character from a first person perspective. Gamers will usually be able to see their character's hands (and sometimes their lower body) as if they were their own. Often there will be a gun in their character's hands and the gamer will be required to shoot various enemies in order to progress through the game. This accounts for the "shooter" part of the term.

Head Mounted Display (HMD) A device used for displaying immersive virtual reality that was first developed by Ivan Sutherland as early as 1965. As the name suggests, the device fits over the viewer's head, and places stereoscopic displays in front of the viewer's eyes. The HMD also returns tracking information back to the computer, so that changes in the viewer's body orientation or head/eye movements reflect in the virtual world. Most HMDs are also equipped with headphones for audio components.

Head Tracking See: **Tracking**

Holodeck A room from the science fiction series *Star Trek: The Next Generation* (1987 - 1994) in which spoken instructions result in the rendering of simulations that are realistic to the point of being indistinguishable from physical reality. The user(s) become central, active participants in these simulations, which are primarily used for recreation and entertainment.

Hypertext A means of structuring text in which the text does not have a prescribed, linear way of being read. The reader is encouraged to actively read it in any order, fragmenting the text and creating interconnecting linkages between these fragments and with other texts. On a basic level this includes browsing the World Wide Web by clicking on hyperlinks inside the text on a webpage, which in turn leads to other webpages. **Hypermedia** functions in a similar way, the difference being that it is media files such as images, audio and video files that the user navigates between.

Immersion Term favoured by immersive virtual reality artist Char Davies. Written as a shortened form of "immersed participant", meaning that the viewer is both immersed and an active participant within the virtual environment.

Immersion Simplifying to the extreme, it is the impression of 'being there'. A defining characteristic of virtual reality, in this context it pertains to sensory immersion. This means that at least two of the viewer's senses are isolated from physical reality and stimulated by the virtual environment to the point where the viewer is convinced of being present within it.

Interactivity Another defining characteristic of virtual reality, it relates to the manner in which the virtual world actively responds to and engages with the viewer. It is also a key factor in allowing the viewer to shape their experience of the work. At a basic level this will usually involve being able to freely navigate and explore the work. There may also be responsive objects or entities within the world that the viewer can engage, act upon or be acted upon by.

Physical Reality The external physical world outside of the virtual reality.

Polysensory Relating to more than one sense at a time.

Proprioception The "secret sixth sense", as Oliver Sacks refers to it (1985: 43) through which one is imbued with a sense of being within one's own body. It is the unconscious awareness of the location of the component parts of the body and through which one is able to move their body.

Real time Media output (usually video) that has not been pre-recorded or rendered but is rather updated as changes occur at the source. For instance, a live feed from a video camera happens in real time. Any virtual reality artwork which responds to the viewer's actions and is interactive also occurs in real time.

Shutter glasses Glasses that are used for creating an impression of three dimensional depth when viewing stereoscopic imagery by extending shutters that alternate between blocking the left and right lens. This occurs at a very rapid rate in time with the refresh rate of the computer's display.

Stereoscopic Imagery that conveys an impression of three-dimensionality by presenting the viewer with the same scene from two slightly different angles. The fused optical illusion appears to be in three dimensions.

Telepresence The impression of being present within a virtual environment. The term can also relate to the operation of robots or machinery from a remote location as if the operator were there. Examples of this include remote surgery (where the doctor is not physically in the same space as the patient) and NASA's Mars Rover missions.

The matrix Alternative term for cyberspace in *Neuromancer* and similar concepts in other cyberpunk science fiction literature.

Tracking The process by which changes in the immersant's body movements are reflected in the virtual environment. Tracking devices measure changes in position from specific parts of the immersant's body in order to allow the corresponding changes to occur in the virtual environment. When an immersant moves their head to look downwards, the virtual point of view adjusts accordingly. When they move their head upwards and to the right, the point of view adjusts again. In order to significantly contribute towards the impression of being telepresent, tracking should be done in real time.

Video glasses Glasses with small screens affixed to either lens. When the glasses are worn, the impression is of looking at a television screen or monitor from a few feet away.

Virtual Environment/World Alternatives to the term virtual reality, used primarily in cases where the authors or artists wished to distance themselves from the media hype and sensationalism (as well as the recreational arcade variety) that they felt were loaded in the virtual reality term. It can also refer to the spatial environment contained within the work.

Virtual Reality Term initially coined by Jaron Lanier and his VPL Research team that pioneered virtual reality interface technology such as the DataGlove in the 1980s. While definitions as to what is encompassed by the term vary (some definitions include computer desktop environments and automatic teller machines) for the purposes of this research it pertains to sensory immersion (through computer hardware) in a three-dimensional interactive computer-generated environment, in which changes in visuals and sound are rendered in real time in response to the viewer's behaviour.

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