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National College of Art and Design
Fine Art Sculpture

Virtual Ecology:

The work of Char Davies

by Karl O Donoghue

Submitted to the Faculty of History of Art and Design and Complementary Studies
in Candidacy for the Degree of Bachelor of Arts in Fine Art Sculpture 1998

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Introduction

Osmosis: Any process by which something is acquired by absorption.

The French translation for the word Osmosis is Osmose.

Osmose is the title of the Virtual Reality art work that is the subject of this thesis. Osmose was created by Char Davies and her team at Softimage in 1995. In the summer of 1997 I was fortunate enough to experience Osmose while it was on show at the Barbican Art Gallery.

As Virtual Reality develops mostly in the field of entertainment, the big picture of what VR could be tends to get lost in the rush for 'content' to 'fill' the new medium. It is up to artists to guard the visionary aspects of what VR could be. Compared to the harmonious products of art, the conceptual products of philosophy look pale and ineffectual while the products of technology often seem a maze of technique for the sake of technique. Davies has utilised technology to create a very beautiful piece of art, that also contains deep philosophical meaning.

Virtual reality is not something normally associated with environmental awareness-in fact it would be more commonly associated with military activity, such as training fighter pilots, or the games industry, or the Hollywood hype which has surrounded it since its emergence in the late 80's. The hype that has surrounded VR is a belief that one day, through virtual reality, we will be able to live in a world where we as humans have total control over the environment, where we no longer need the physical body.

When on exchange in Chicago in early 1997 I had a chance to visit the Electronic Visualization Laboratory of the University of Illinois at Chicago. Under development there is a project called the CAVE. The installation

there is for research purpose only, but luckily I was given the opportunity to have a go (the only public installation of the CAVE is at Ars Electronica in Europe).

The CAVE is a surround-screen, surround-sound system that creates immersion by projecting 3D computer graphics into a 10'x10'x10' cube composed of display screens that completely surround the viewer(s). There are three wall projections and one floor projection. Head and hand tracking systems produce the correct stereo perspective for one viewer. Multiple viewers often share virtual experiences. Although there is only one active viewer, all the perspective points are referenced to that person, and the other viewers are passive. The viewer explores the virtual world by moving around inside the cube and grabbing objects with a three-button, wand-like device. Light weight stereo glasses are worn rather than a head mounted display (HMD) as in Osmose.

Michael Heim in his essay "The Design of Virtual Reality", makes comparisons between CAVE VR and HMD VR. The HMD display type of VR, he claims, produces 'Tunnel VR' or 'perception-oriented immersion'. The projection or CAVE VR, on the contrary, produces what Heim calls 'spiral VR' or 'appreciative immersion'. Heim compares the head mounted display of HMD VR, to the hood that covers the head of a pet falcon. Such falcon-hood immersion derives from not having a choice of where to look. The falcon grows tame under the hood because it is temporarily blind to the larger world. Likewise according to Heim, the HMD immersion results from the primary body giving way to the priority of the cyberbody, and a tunnel-like perception of the virtual world results.

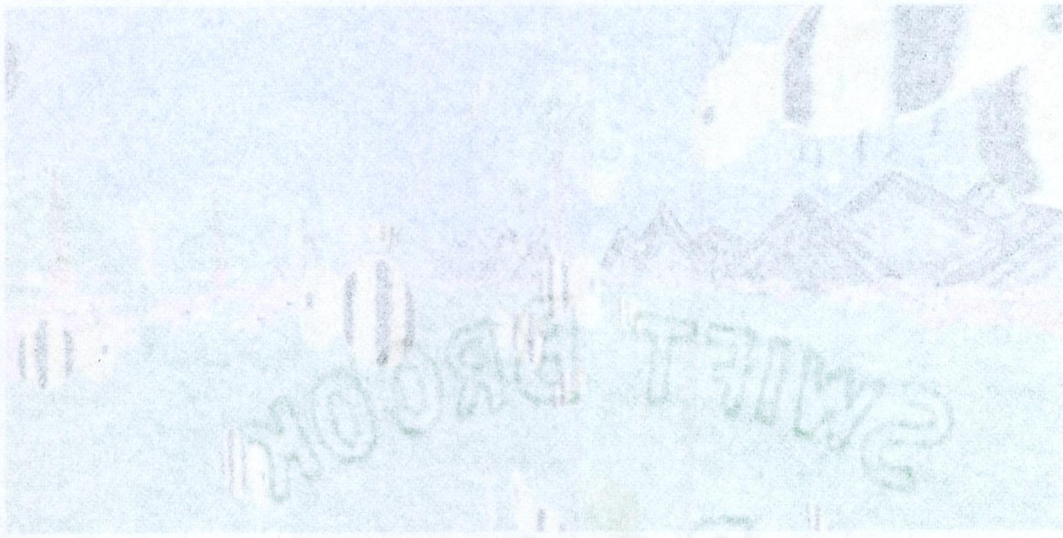
In the CAVE, Heim says, because the user's body is immersed without having to adapt to the system's peripherals (helmet, data glove, earphones), the CAVE immersion does not constrict but rather enhances the user's body. The basis of Heims argument is that CAVE immersion enhances the user's body because the user needs their body in order to navigate in the space. I

suspect that Heim wrote this essay before experiencing Osmose, because for me the sense of immersion in Osmose was far greater than in the CAVE. Davies has overcome the problems associated with using a head-mounted display. Navigation in Osmose does not need a wand-like device, it is based on natural bodily functions (breathing and balance). I also feel the CAVE lacked philosophical thought. The 'art' created to be displayed in the CAVE, while excellently animated, seemed, as Heim put it when talking about the products of technology and how art needed to protect an emerging technology like VR, "a maze of technique for the sake of technique" (fig. 1).

(fig. 1) Crayoland, created by Dave Pape to be shown in the CAVE at the EVL University of Illinois at Chicago. This VR work is based on two-dimentional crayon drawings.

These are just some of the reasons why I changed my mind about making the CAVE the main subject of this thesis. Although it is a genuine progression in the realm of VR, I felt that there was no particular art work that I could talk about. Whereas in Osmose (sometimes called the first VR art work) there is an abundance of philosophical and aesthetic content.

The subject of the first chapter will be Descartes. I will discuss how his thinking has influenced Western culture, and how conventional virtual reality is a product of this culture. In the seventeenth century Descartes posited a strict separation between the realm of human consciousness and



the natural world. This way of thinking has been widely accepted in the western world, and has helped shape our cultural values. Descartes devised a co-ordinate system, a grid created by the x, y, and z axes. This grid is the foundation for most of today's computer graphics. It produces a cold linear environment, quite the opposite to the world of 'Osmose'. I will talk about how the grid system Descartes developed has had a rigidifying effect on our environments, especially our virtual environments. I will be making comparisons between conventional virtual reality, and the virtual world of Osmose, and how Davies challenges the acceptance of traditional Cartesian space. The consequence of this acceptance of Cartesian thinking has been the separation of thought from the rest of life or nature. According to Descartes, only "man" has the ability to think, and this ability separates him from the rest of the world, even from that part of the world that houses that thinking, the body.

This will lead me into chapter two where I will begin talking about 'Osmose' as a VR piece. In this chapter I will discuss more specifically the goals of Char Davies and her team at Softimage, such as the attempt at healing the Cartesian split between mind/body, subject/object, which was outlined in Chapter One. It has been said that to experience immersive virtual environments, one must leave one's body outside, or replace one's body with a virtual body. This 'leaving' of the body is a realisation of Cartesian philosophy. I will discuss how Davies challenges this philosophy with the unique interface of 'Osmose'.

Chapter Three will attempt to bring the philosophy of Descartes into direct confrontation with the beliefs of Davies, and subsequently conventional virtual reality. To talk about these conflicting ideas I will refer to the essay 'Deep Ecology' by Warwick Fox. 'Shallow ecology' is the belief that nature, and everything in nature, is only there to serve human beings. 'Deep ecology', on the other hand, is the belief that human beings are only a part of nature, and do not control nature, as shallow ecologists believe. Descartes' belief was that through mathematical calculations and theorems,

humans could have a full understanding of nature and therefor control it. This way of thinking has been the basis of humanity's neglect of the planet. It is from critiquing this philosophy that the deep ecology movement has grown. Talking about ecology through a medium such as virtual reality is problematic. There are many contradictions and ironies involved, such as the irony that Davies is trying to heal the estrangement between ourselves and nature with the same computer technology that trains fighter pilots to blow it up. Or the fact that a large proportion of the hardware used is made by people in third world countries, because of cheap labour. These ironies will also be the discussed in this chapter.

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Chapter 1

(i) The Philosophers Dream

In Simon Penny's essay, 'Virtual Reality as the Completion of the Enlightenment Project', he attempts to place virtual reality (VR) within, and as a product of, the philosophical project of the Enlightenment. Central to this critique he uses the proposition that while VR is technically advanced it is philosophically retrogressive. VR strives for realism in the same way as painters in the early Enlightenment period, it does not challenge the contemporary Western cultural view. VR reasserts a mind/body split that is essentially "patriarchal and a paradigm of viewing that is phallic, colonizing, and panoptic" (Penny, 1994, p.237)

The key figure is Rene Descartes whose thinking set the scientific and technological revolution in motion. In his famous dream of 1619 he was advised that he should find the unity of the sciences in purely rational terms. The irony at the heart of rationalism is that it arose from a dream.

Aristotle many years before Descartes, hesitated over whether the intellect might be separate from the body. This was a starting point for Aquinas, who argued that the intellectual soul of human beings is something that is capable of existing in its own right. He argues that the 'sensitive' and 'nutritive' parts of the human soul (the parts that are shared with animals) belong to the human being as composite of soul and body; but the higher faculties of intellect and will (the parts that set us apart from animals according to Aquinas) belong to the soul and the soul alone, therefore such powers must remain in the soul after the destruction of the body. This special treatment of intellect and will paves the way for the radical mind/body dualism of Descartes centuries later.

Descartes is one of the key figures in the overthrowing of the traditional Scholastic' philosophy based on Aristotle. His aim was to lay the

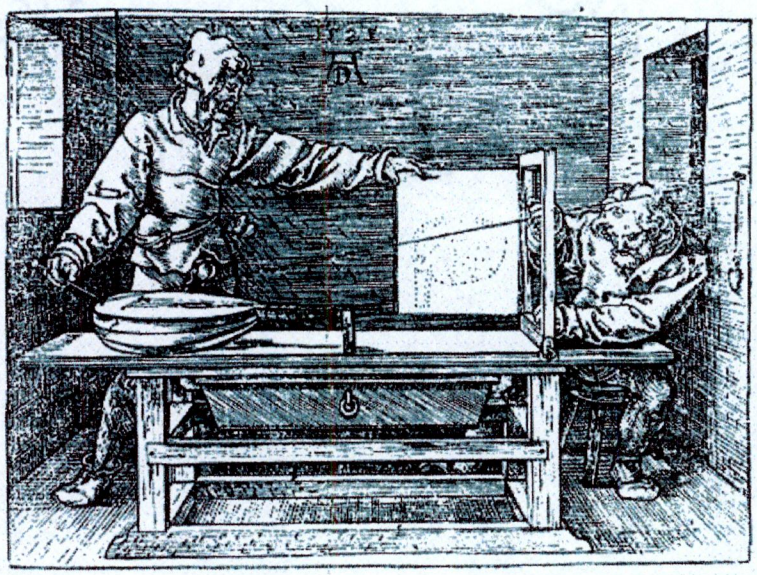
foundations for a new approach to the sciences, based on clear and distinct mathematical ideas. He aimed to provide a comprehensive scientific account of the universe based on mechanical principles and mathematical laws, but he argued that the human capacity for thought and language could not be explained in this way. He reasoned that since it is possible to doubt the existence of the body, but not his own existence as a conscious, thinking being, it must follow that the soul is entirely distinct from the body and could exist without it.

Descartes had devised a systematic method of doubt; anything that could be called into question for any reason whatever, will be discarded. Previous beliefs acquired through the senses are all eliminated on the grounds that senses have sometimes proved unreliable. There is one truth that cannot be doubted: 'I am thinking therefore I exist.' (Ed. Cottingham, 1996, p.22)

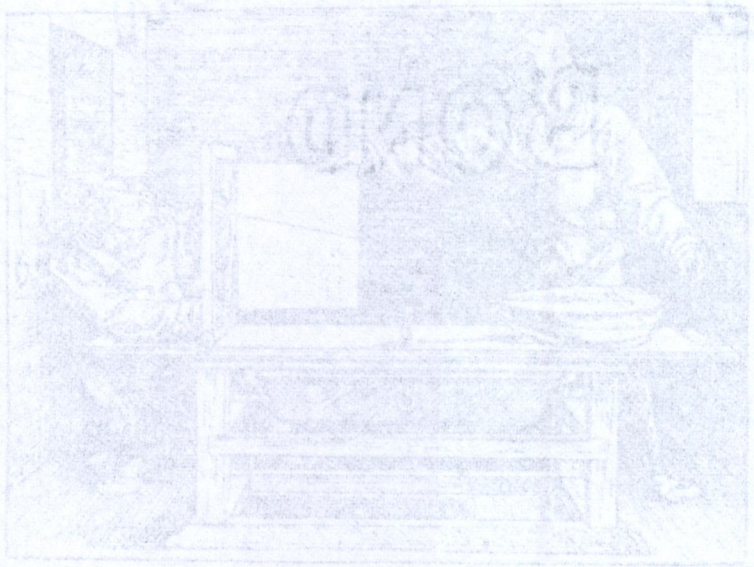
Once the mathematical principles were established, Descartes claimed to be able to use them to construct a complete account of everything that occurs in nature - the workings of the entire universe, the stars, the planets, and all phenomena on earth, including animal life. Mathematical physics became the master discipline that could in principle explain everything, with the one exception of consciousness. He believed that consciousness was the one absolute truth that could not be called into doubt. Descartes argues that the new science is not just to have knowledge, but to give us technological control. Understanding the environment and our own bodies will enable us to become 'masters and possessors of nature.' (Ed. Cottingham, 1996, p.310)

Using algebra and a coordinate system, Descartes developed an abstract geometry that enabled the description of three-dimensional perspective on a two-dimensional plain. This is known now as Cartesian space, and comprises two parts: the motion of three infinite axes intersecting each other at ninety-degree angles and the division of these axes into continuously discrete quantities. With Descartes' geometry there was no need for tools, or

even reference to the real world. Before the formulation of analytic geometry, use of the grid was characteristic of the perspective experiments of many Renaissance draftsmen who sought accurately to represent space from a unique, fixed, monocular viewpoint (fig. 2). These earlier techniques used manual or optical methods to trace objects to points on a canvas while preserving the relationships that existed between them, distance, depth and so on. Descartes' method defined abstract objects in an imaginary world of a selected coordinate space, and gave equations to calculate points of intersection, perspective, and depth algebraically. The advantages of this system over earlier ones, are that it deals with abstract constructions and requires no reference to the physical world. This abstract method for representing objects and their relationships to the three-dimensional world forms the foundations for graphics imaging on computers. But this grid (and polygonal construction within the grid) radically limits the possibility of constructing organic, amorphous forms. It privileges crystalline, coherent, independent forms.



(fig. 2) Albrecht Durer, woodcut from The Artist's Treatise on Geometry (1525) demonstrating a technique for creating three-dimentional perspective. The Metropolitan Museum of Art.



(ii) Virtual Cartesianism

Recently there has been some criticism of the computer-graphic establishment for its endorsement of a 'gendered' Cartesian space. Computer-graphic production as seen in commercial cinema, video games, theme-park rides and military simulations, is allegedly dominated by a Western male psyche and worldview. Simon Penny remains troubled by what he sees has been an "unsubstantiated conceptual leap between the critique of gendered VR spaces and criticism of the utilization of the Cartesian grid." (Penny, 1994, p.231). He argues that one can offer any amount of criticism of the rigidifying effect of the rectilinear grid on our architecture, our city environment, even our 3-D modeling programs, but the Cartesian grid is built into our culture and our perception as an integral and structuring part of the rationalist determinism with which we have been inculcated. Penny argues that to propose an alternative to Cartesian space is to propose an alternative to the philosophical and technical legacy of the Enlightenment. He argues that to imagine an alternative space such as a system of polar space would seem to invest it with a centre and a phallic core, and that at least Cartesian space does not privilege any part over any other. Osmose is also an alternative to Cartesian space it does not privilege any part over any other, and there is no rigidifying within this space. Perhaps if the Enlightenment project had based its philosophy on being part of nature rather than being dominant over it, we would live in less rigid environments.

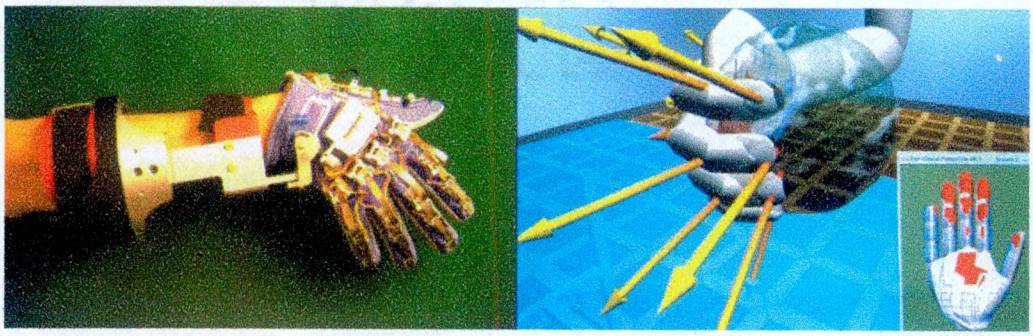
Prior to the last century Christianity has served as the basis for Western philosophy Philosophical ideas such as the duality of Rene Descartes mind/body split, are based in Christian doctrine. William Gibson's cyberpunks proclaimed that "the body is meat," but they failed to notice just how similarly their position was to that of Christian believers.

(iii) The Disembodied Body

Key ideas of feminism and poststructuralism include questions of gender, of re-owning the body. These discourses critique the Enlightenment values of the authority of a rational master discourse and the subjugation and rejection of the body.

In VR the body is a void. VR arms the eye, it gives the eye a hand of its own, propelled by the gaze itself (fig.3.b). The entire body is propelled by scopic desire. We are taught to regard our bodies as an instrument, as apparel, our culture customizes its bodies like it customizes its cars. The body is a representation only, an external appearance, and may be adjusted to suit the taste of the owner. The absolute malleability of the virtual body is different from this only in degree. Attitudes to the surgical customizing of the flesh, 'body sculpting' and the designing of the virtual body, both assumes and reinforces a Cartesian duality by restating the body as pure representation.

fig. 3.a *fig. 3.b*



(fig. 3.a) Shows the ARTS Glove, developed at the ARTS Lab of the Scuola Superiore S. Anna. *(fig. 3.b)* shows the grasping procedure of the virtual hand.

When one wears eyephones and earphones, one shuts out the visual and auditory and replaces it with a representation. This leaves one part of the sensorial body in the corporeal world, and the other part in the virtual world. In order to have a fully simulated representation of the body, the internal senses and the kinesthetic must be represented. At this point in virtual reality's development, we do not come close, and it is unlikely that any

amount of gadgetry will ever be able to facilitate total body representation.

The VR condition is therefore the limited case of a simulated, interactive, stereoscopic, visual and auditory environment, in which the body is represented only visually. VR replaces the body with two partial bodies, the corporeal body, and an incomplete electronic 'body image'. On a bodily level, the conventional VR experience is of dislocation and disasociation. This is precisely what Char Davies is challenging in Osmose. It has been stated that one does not take ones body into virtual reality, one leaves it at the door. In Osmose one needs ones body in order to be able to move around the virtual space.

Conventional VR reinforces Cartesian duality by replacing the body with a body image, a creation of mind. In Osmose there is no reference to the body, there is no representation of the body, this leads one to look within one's self, for one's own body image. Conventional VR is a clear continuation of the rationalist dream of a disembodied mind, which is part of the long Western tradition of the denial of the body.

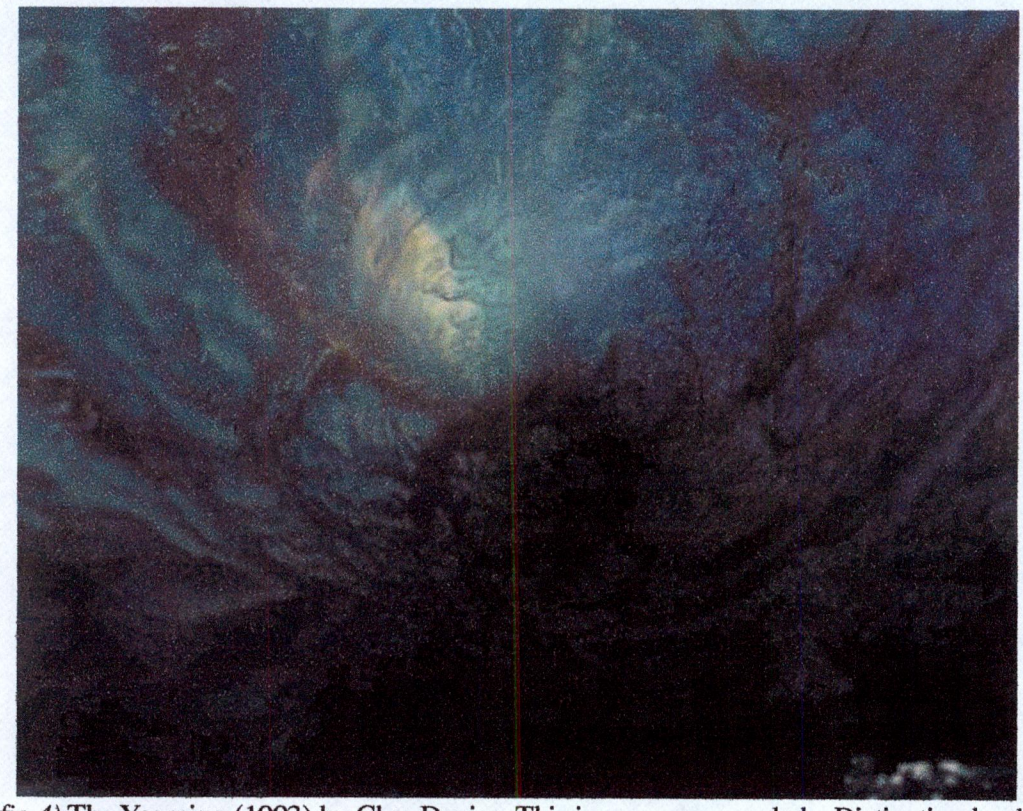
The meat body, when one is experiencing conventional VR, becomes only a machine to press the appropriate buttons or to re-aim the viewpoint, driven by a desiring, controlling mind. The body does not feel, it does not register the virtual world. Only the eyes, privileged as the most accurate of the senses since the Renaissance, register the virtual world .

Technologies are products of culture. The ideas that have constructed virtual reality are not new but, rather, have deep roots in our culture. It is the fabric of everyday culture that lends meaning, and confines meaning to these virtual worlds. The developers and their worlds are immersed in, and informed by, contemporary culture.

Chapter 2

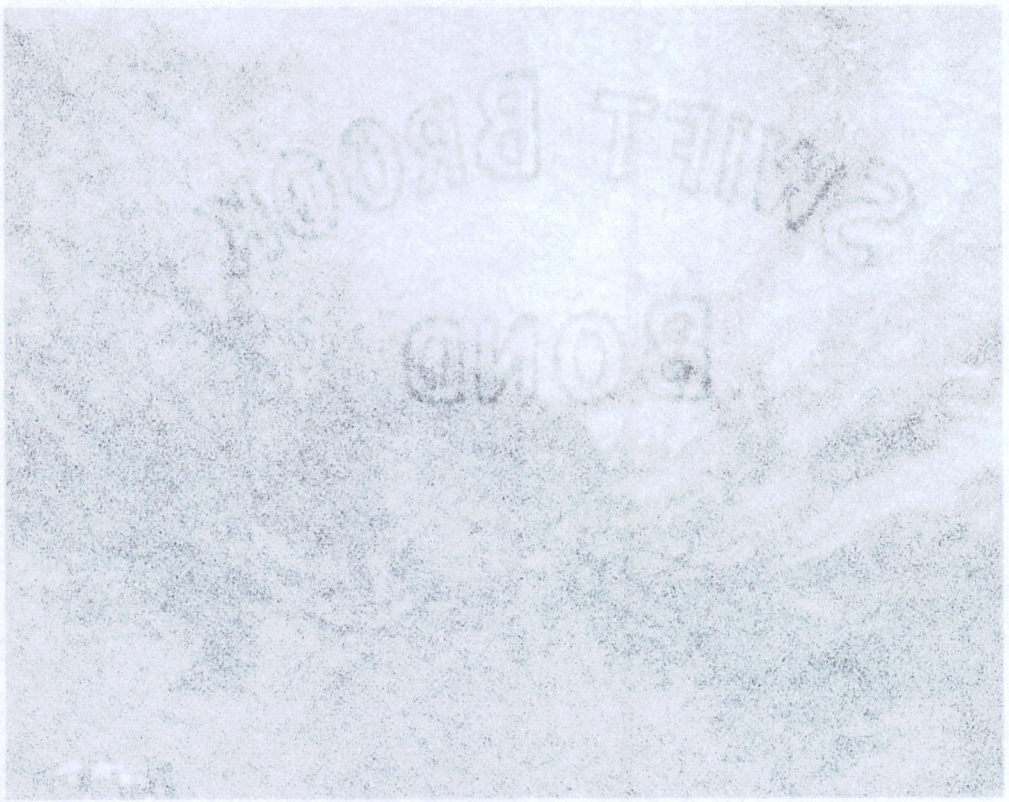
(i) Osmose

Davie's background as a painter has influenced Osmose' visual aesthetic greatly. She began her artistic career as a representational painter in the mid-seventies, mastering the conventions of photo-realism, but she soon abandoned this world of hard edges and solid surfaces for a world of 'enveloping' space. This loosening of reliance on external appearances, led Davies inward. By the mid-80's she abandoned the medium of painting altogether, for 3D computer graphics, this offered her the chance to create a virtual three-dimensional space.



(fig.4) The Yearning (1993) by Char Davies. This image was awarded a Distinction by the Prix Ars Electronica 1992 jury in the category Computer Graphics.

When talking about the content of her early computer graphic works such as 'The Yearning' (fig. 4) Davies described them as "an ongoing quest for an underlying unity of nature and psyche. Fueled by a desire to compensate for



(fig.4) The Yearning (1992) by Char Davies. This image was awarded a Distinction by the Prix Ars Electronica 1992 jury in the category Computer Graphics.

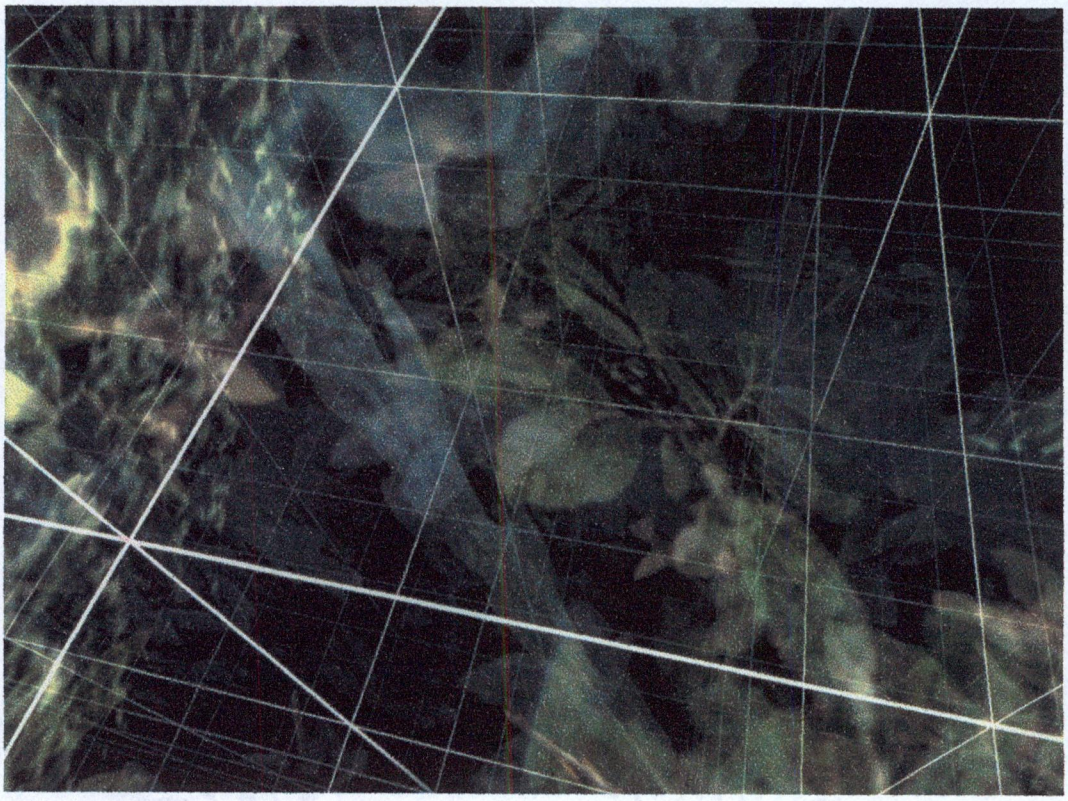
living in a world that has become de sacralized and increasingly bereft of untainted wild places. They are an attempt to express and reaffirm our spiritual embeddedness in nature. As such, these images are intended to have a hierophanic (i. e. 'manifestations of the sacred') quality" (Davies, http://artnetweb.com/artnetweb/gallery/code/char.html).

Over the period between 1990 and 1993 she created a series of images called 'The Interior Body Series'. These were made up of images called 'Leaf', 'Root', 'Seed', 'Stream', 'Drowning' and so on. These are all metaphorical themes which recur in Osmose. Davies does not consider her art to be computer graphics or computer art, but rather art created through computer technology. Davies was trying to achieve a sense of 'enveloping' space with her still images so it seemed only natural that she would move into the Virtual Reality realm, where the sense of space been all around can be achieved far more satisfactorily than that of a still image. Access to the kind of technology needed for a piece like Osmose does not come easily, and it was only due to Davies' linking up with Daniel Langlois, in the early stages of the development of Softimage (the computer graphics company that he founded), that Davies had access.

Davies' work involves a shift away from VR's usual Cartesian space, a shift that is hinted at when one first enters Osmose. When one first puts on the head-mounted display the first thing that one sees is a white grid against a black background. The grid stretched off into infinity in all directions. It functions in two ways; first is the practical function which is to serve as a practice area where one can get used to navigation, and secondly the philosophical function which is to hint at the Cartesian mathematical grid. When you are satisfied that you can navigate the space (usually taking not more that a minute) the attendant starts the computer. The grid soon melts into a forest-like area (fig. 5).

There are no sharp distinctions between the different spaces of Osmose as there is in conventional virtual reality, where different spaces are usualy

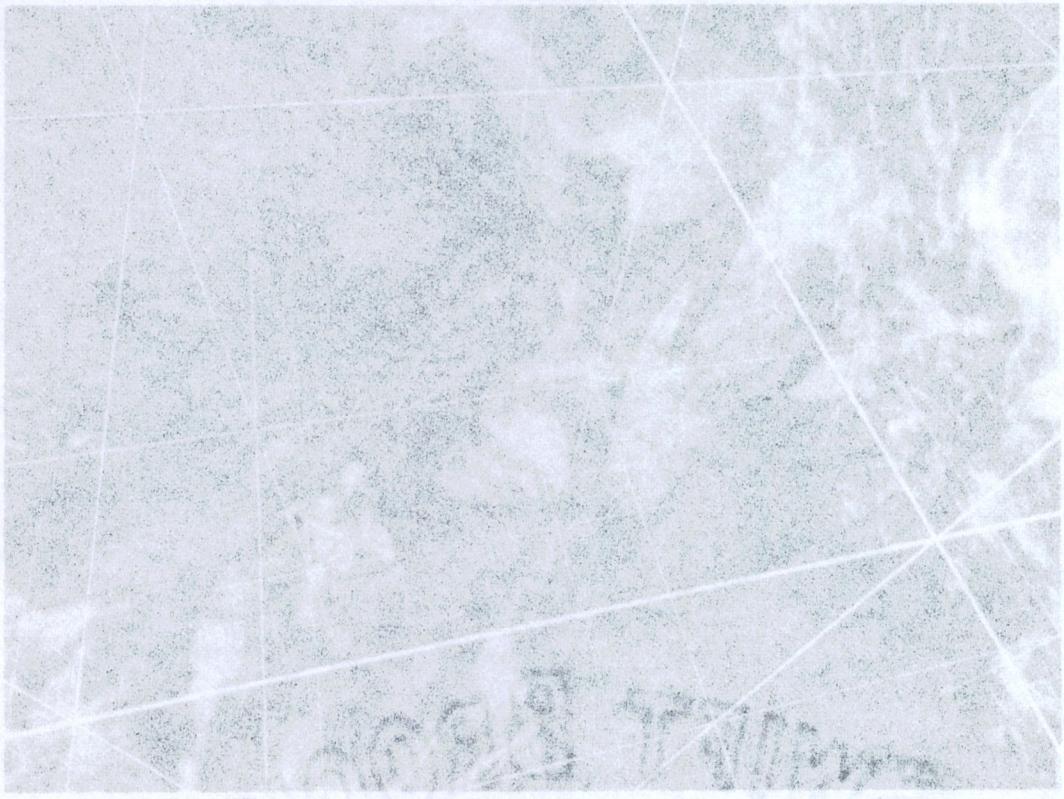
devided by doors and coradoors.

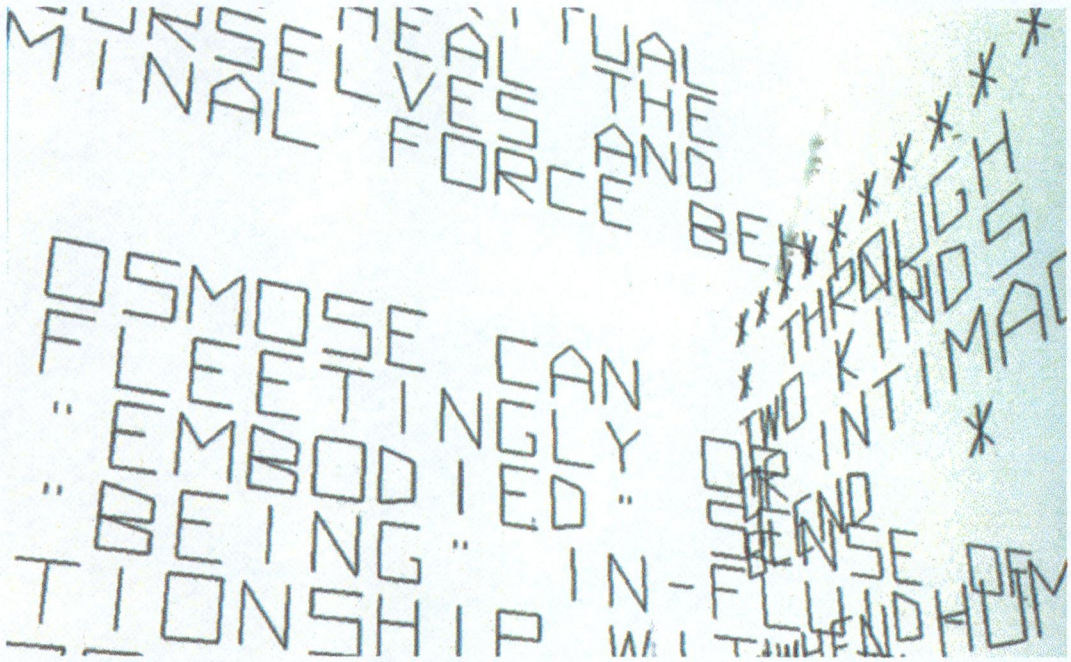


(fig. 5) The Grid.

Osmose is composed of several different elements, a tree standing in the middle of a clearing, a forest, water on a lower level, the computer code in another lower level and the text (poetry, philosophical texts, etc.) on the upper level. All those elements are not separated in different rooms as usual in VR but belong to the same global structure that you travel through.

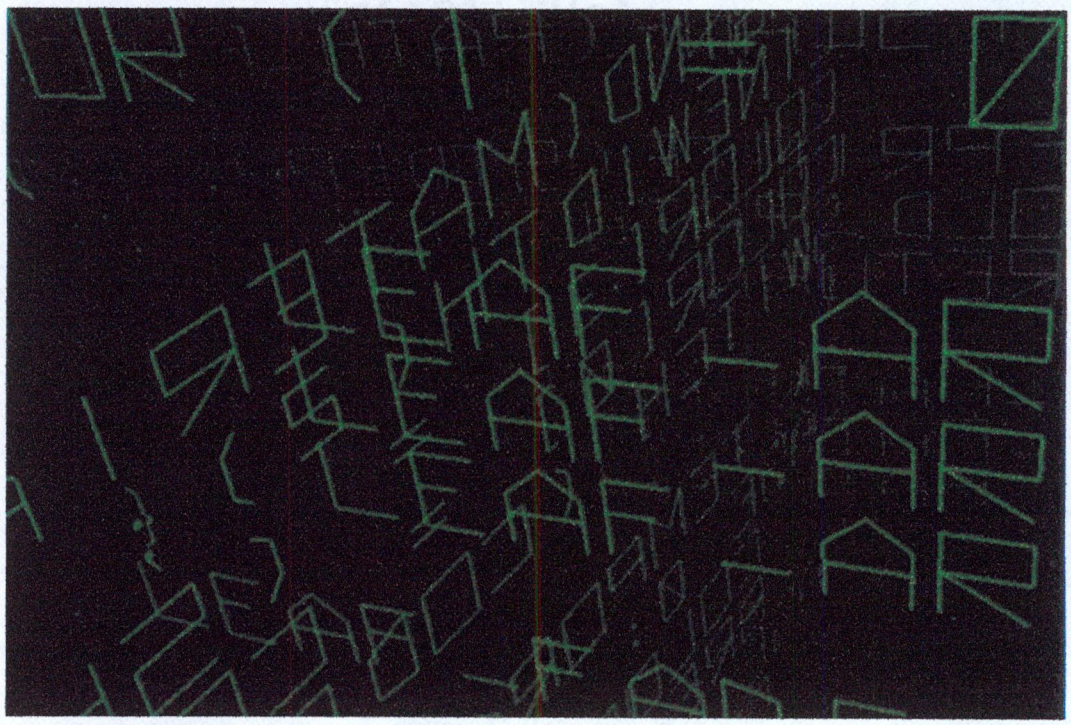
In the text world (fig. 6) Davies quotes some of her favourite philosophers and poets. Passages from Heidegger, Reilk, Huxley, Joesph Camble, and Gaston Bachelard explore issues of nature, the body, and technology itself. Interspersed with these texts are some of Davies' own writings about Osmose. This world is "above" all the other worlds. The floating words in the text world were used because she wanted philosophical concepts to be represented by images.



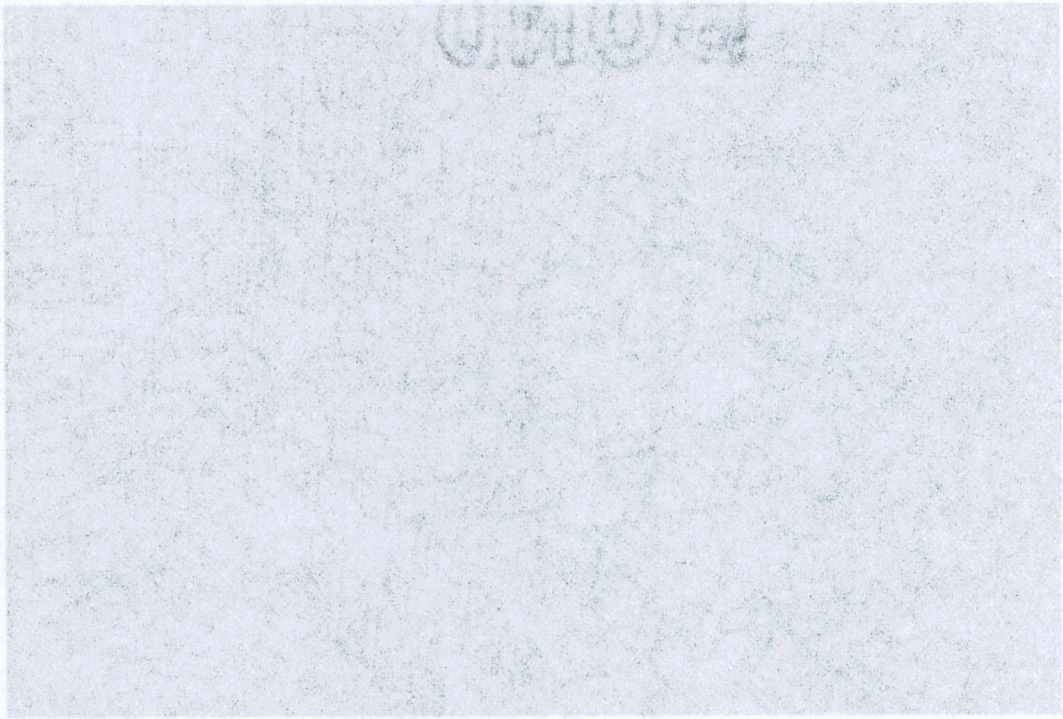


(fig. 6) The Text World.

The lowest level within the world of Osmose is the code world (fig 7). Recognising that Osmose is essentially software, Davies literally placed its programming at the bottom of the virtual universe. Beneath the ground under the forest is line after line of glowing green code, grounding the virtual space of Osmose in the computer language in which it is written.

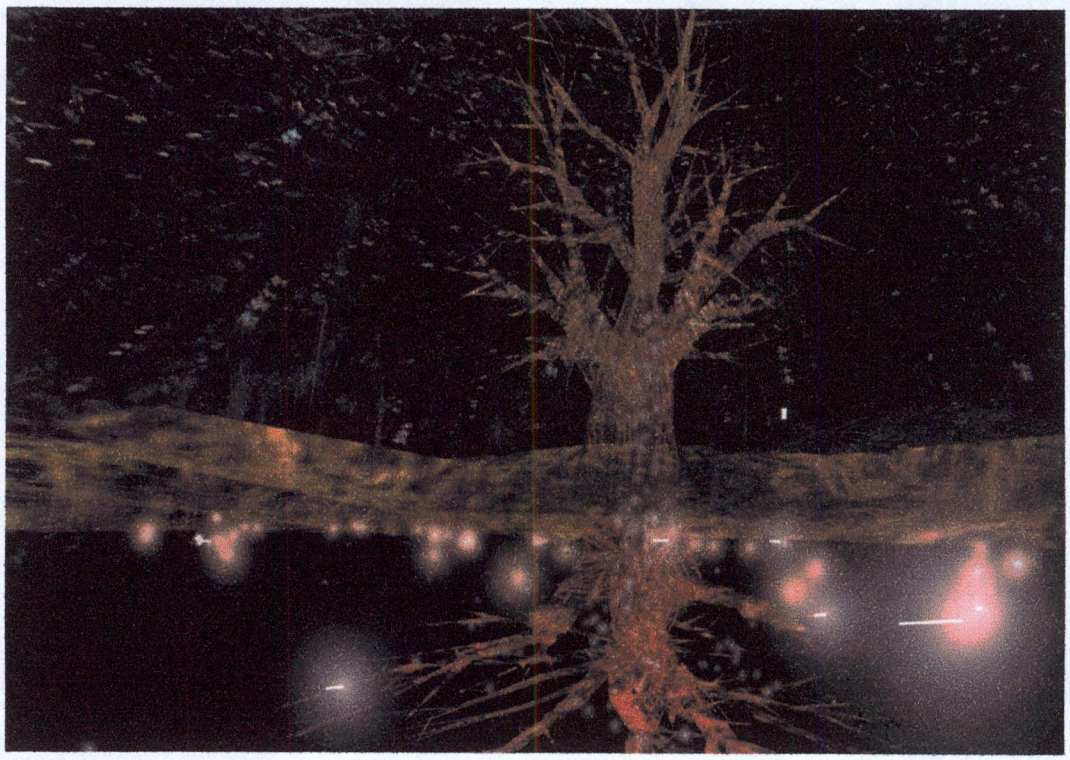


(fig. 7) The Code World.



According to Davies, these two worlds act as symbols of concrete reality bracketing the world within . They remind the immersant and the viewers that Osmose is a highly crafted construction, a product of both great technological sophistication and intensive conceptualization.

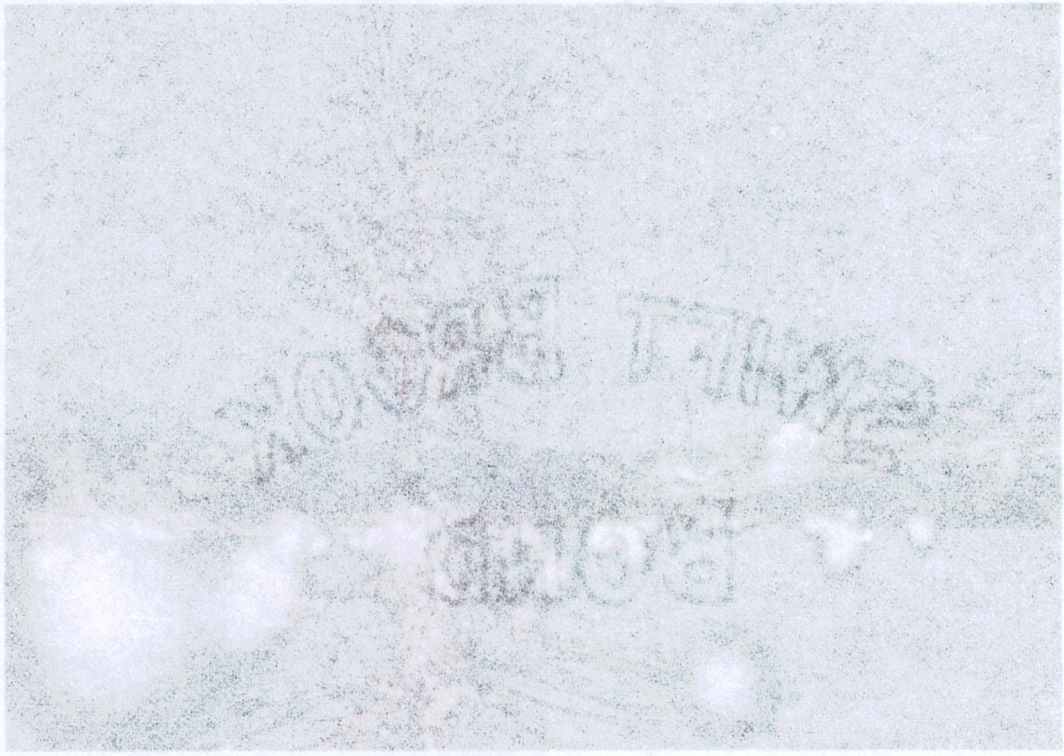
The tree world or clearing (fig. 8) is at the centre of the virtual piece. One can aproach the tree from a distance. Starting off small traveling towards it it gets bigger until one finally enters into the system of cells and veins.



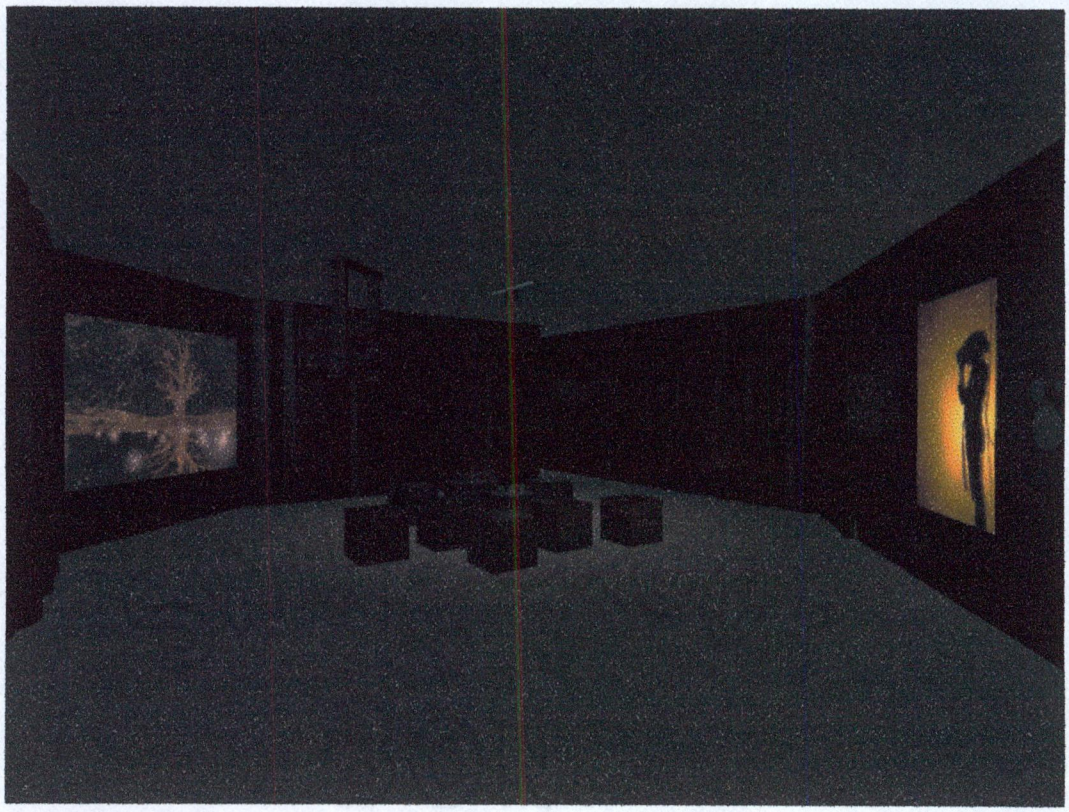
(fig. 8) The Clearing.

Davies has described the work as "a work-in-progress exploring the potential of immersive virtual space, as a medium for visual/aural expression & kinaesthetic experience of philosophical ideas." (Davies quoted in McRobert, 1996, p.1)

Davies has found a satisfactory solution to the problem of installing a head-mounted display work in a traditional museum setting. Users are



screened from voyeuristic eyes behind a scrim that turns them, via their silhouettes, into virtual performers. Others follow the experience vicariously, through a live video output, sometimes shown as a stereoscopic projection, in a darkened gallery space (fig. 9).

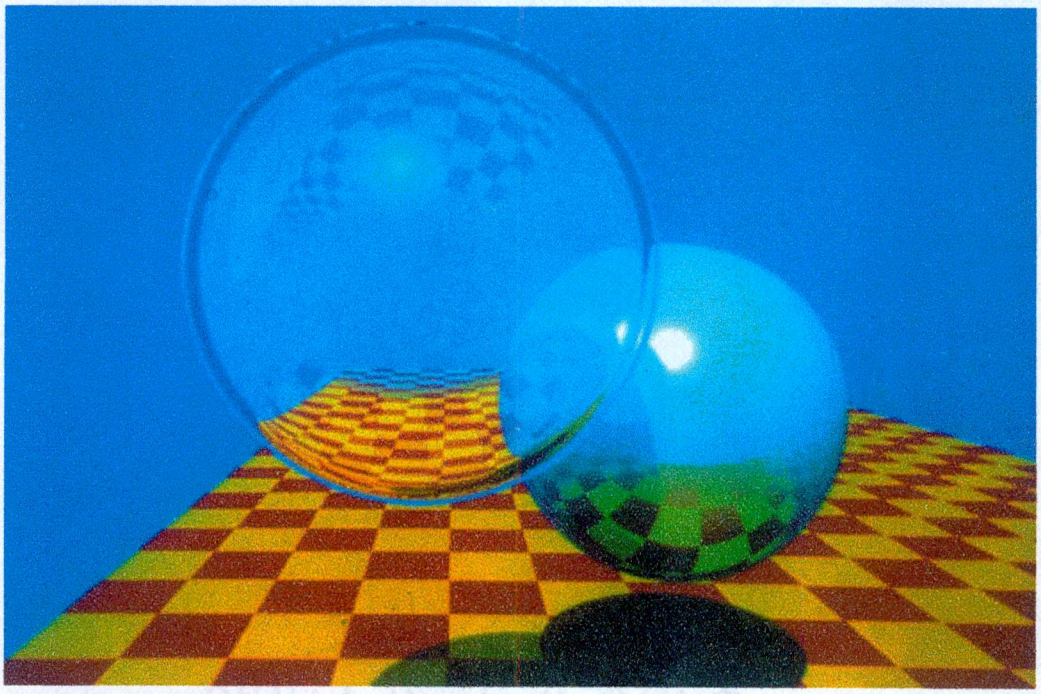


(fig. 9) Instalation view of Osmose showing the screen on the right behind which the immersant stands, and the space where non-immersants can view the visuals.

The resolution of this projection seemed tantalisingly good, and encouraged many users to expect Osmose under the helmet would be as crisp as the VR sequences faked for such Hollywood films as 'The Lawnmower Man'. But the gap between the hype and the reality of VR is still quite wide. This in turn tends to obscure the solid technical improvements that have been made in the past few years, with more projected for the immediate future.

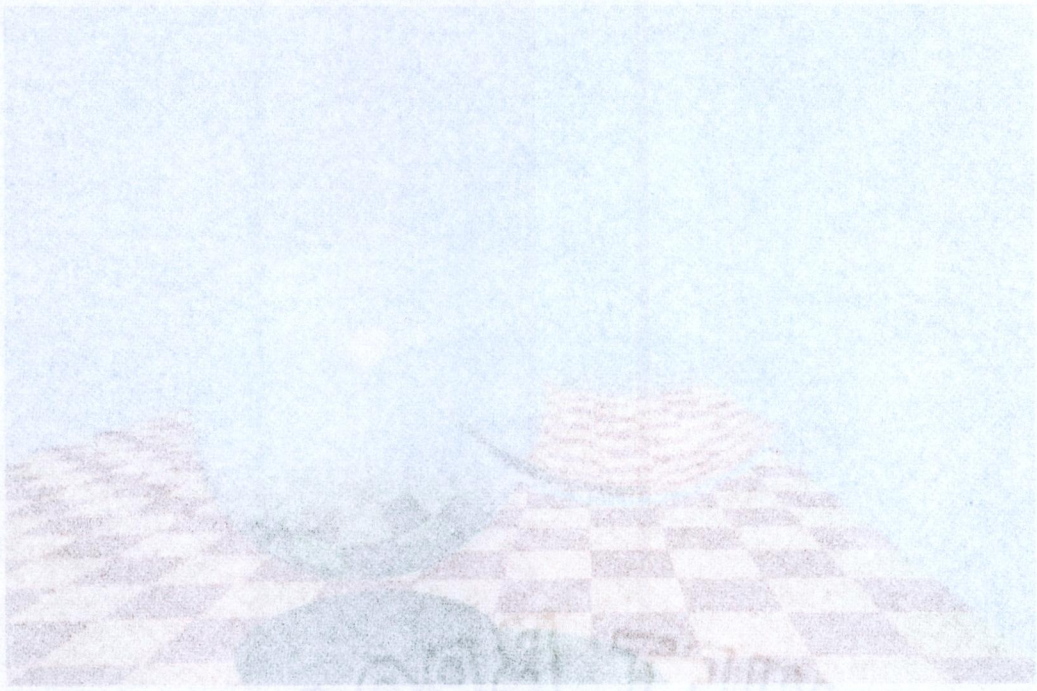
The interface, together with the smooth colours, is probably one of the major keys of the achievements of Osmose. For the first time you move in a virtual space as you would in a physical one. The graphics are the total

opposite of the crude bright colours of conventional computer graphics (fig.10).



(fig. 10) Turner Whitte made this image to demonstrate the nature of reflectivity.

The main driving force behind the creation of Osmose was "a desire to heal the Cartesian split between mind and body, subject and object," which according to Davies "has shaped our cultural values."(Davies, 1995, p.1) The work was inspired by a profound deep-sea diving experience in the Bahamas, where Davies got an unforgettable taste of virtual space. She recalls how "diving out over the abyss, where you don't have a ground or coral heads to look at, you can get a very abstract and pure sense of space"(Davies quoted in Davis, 1996, p2). This was the first time that Davies had encountered a space where there was nothing to see, where there was "no separation between inside and outside." If you saw a tiny speck, it would be difficult to know if it was "the glint in a barracuda's eye, or a little jellyfish, or a misfiring of a rod in the retina of your eye". Through Osmose, Davies is trying to give the 'immersant' the kind of profound experience she had underwater, an embodied experience of space, one that begins to dissolve the habitual boundaries we maintain between inside and out, between self and world.



Osmose is about "being-in-the-world in its most profound sense. It's about our subjective experience as sentient, embodied, incarnate, living beings in enveloping flowing space." (Davies quoted in Wertheim, 1996, p1)

Some of the goals of Osmose were that the viewer would re-enter the real world with greater sensitivity for the nature of things. She hoped that the experience might create a new understanding for philosophising about nature.

(ii) To Re-embody the Body

As we have seen from Chapter One conventional VR projects reduce the human subject to an isolated and disembodied being manoeuvring in empty space. Cyberspace is the epitome of Cartesian desire, for it enables us to create worlds where we have total control. Most of the hype surrounding VR reflects a longing to transcend the limitations of our physical surroundings. The long term effect of this, according to Davies, may be to seduce us away from our bodies and ultimately nature.

Michael Heim, when writing about virtual reality, referred to a "leaving the body at the door of the virtual world," but what body is being left at that door? Karen A Franck suggests that it is the 'fleshed' body. The body that needs to eat and sleep, the one that is frail, can become diseased, and will die. She believes that this desire to transcend the flesh body is a masculinist dream. (Franck, 1995, p. 22) Religion, science, and philosophy in the West have continuously devalued the fleshy body and its material needs and preoccupations and associated it and them with women.

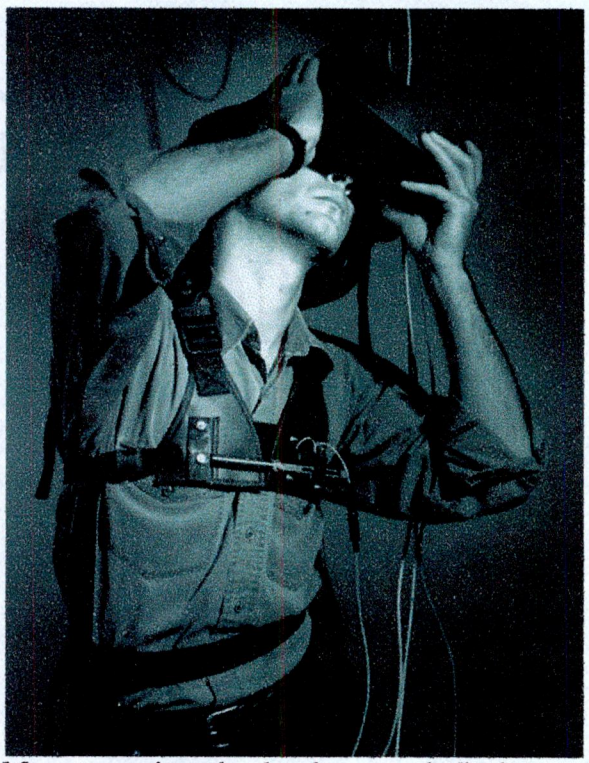
Davies challenges the masculinist dream of transcending the flesh body by not leaving it outside , but by bringing the body 'in' to that virtual world, and making it a part of the piece itself, creating a "natural" interaction between the participant and the virtual world. It is the user's body that controls his or her journey through Osmose. In most virtual environments, motion is

controlled by a joystick or other manual device that gives the user a kind of godlike control. It's a practice that was imported from arcade games, which in turn took their cue from military planes and simulators (fig. 11). The work avoids the "masculinist" preoccupation with tropes of penetrating or mastering space reducing our chaotic experience of reality to a more manageable over-simplified model i.e. mastering the world on our terms rather that experiencing it as it is. VR is a safe environment to explore the mind-body experience liberating us from the everyday impulse to prioritise the mental over the physical.

(fig. 11) Flight training simulatior.

The method that is used to ground the work in the body is the unique interface that was developed specifically for the piece (fig. 12). The concept of interface has changed over the years from one that only included the hardwear and softwear through which the human and computer comunicated to a concept that includes the "cognitive and emotional aspects of the user's experience as well. An interface is a contact surface. It reflects the physical properties of the interactions, the functions to be proformed,

and the balance of power and control." (Gigliotti, 1995, p. 293) Gigliotti suggests that the interface must reflect our sense of wholeness as physical beings and our trust in our ability to make judgments. The interactive aesthetic or user interface of Osmose was designed to be body-centred, based on the intuitive, instinctual processes of breathing and balance. The methods of navigation, which were largely inspired by scuba diving, are based on physiological movements. You bend forward, backward, left and right for the horizontal axis and you exhale and inhale for the vertical one. This method of navigation is intended to re-affirm the role of the living physical body in immersive virtual space as subjective experiential ground. "As in meditation, the practice of following one's breath and being centred in balance opens up a profound way of relating to the world." (Davies, 1995, p. 3)



(fig. 12) Georges Mauro wearing the head-mounted display and breathing/balance interface vest for Osmose. Photo: Jacques Dufrense.

> Breath is a potent tool of overcoming dualism. Physiologically, respiration stands at the very threshold of the ecstatic and visceral, the voluntary and the involuntary..... inside and outside,

> self and other are relativized, porous, each time one takes a breath. The air is constantly transgressing boundaries, sustaining life through inter-connection.
> Balance is a question of centring. When we are properly centred, our experience of being is in equilibrium. Being well-centred, we can encounter other beings in a more open, receptive way. Finding our centre is a necessary step in the development of our ontological capacity to open ourselves to the larger measure of being and to encounter other beings with a presence that is deeply responsive. Coming home to our true centre of being, we can begin to relax our geological defences, and begin to experience things outside the subject/object polarisation. Being well-centred in Being is therefore at the very root of Gelassenheit, that "way of being" in virtue of which according to Heidegger, we are going to be most favoured with a deeper experience of beings, and the presencing of being. (Drew Leder in Davies, 1995, p.3)

Osmose also demonstrates the dominance in VR of the spatial metaphor, which is frequently underpinned by a narrative structure that emphasises a journey or travel as the primary mode of interaction.

Osmose offers a new, more physical approach to the relationship between the perceiving body and the spaces of information. The interface does not bracket out the bodily processes from the means of accessing information, as does most current interface technologies such as the World Wide Web, or most virtual reality interfaces, where pointing and clinching phallic tools is the means for interactivity. Heidi Tikka in her essay "Cyberspace: A Feminist Point of View", suggests that current interface technology built on the notion of Cartesian space is only capable of producing a masculine subjectivity. (Tikka, 1996, p.4) She argues that information space can only be accessed by the symbolic phallic tool, i.e. the cursor. Information is accessed through a pointing and penetrating. In Osmose, sense of balance

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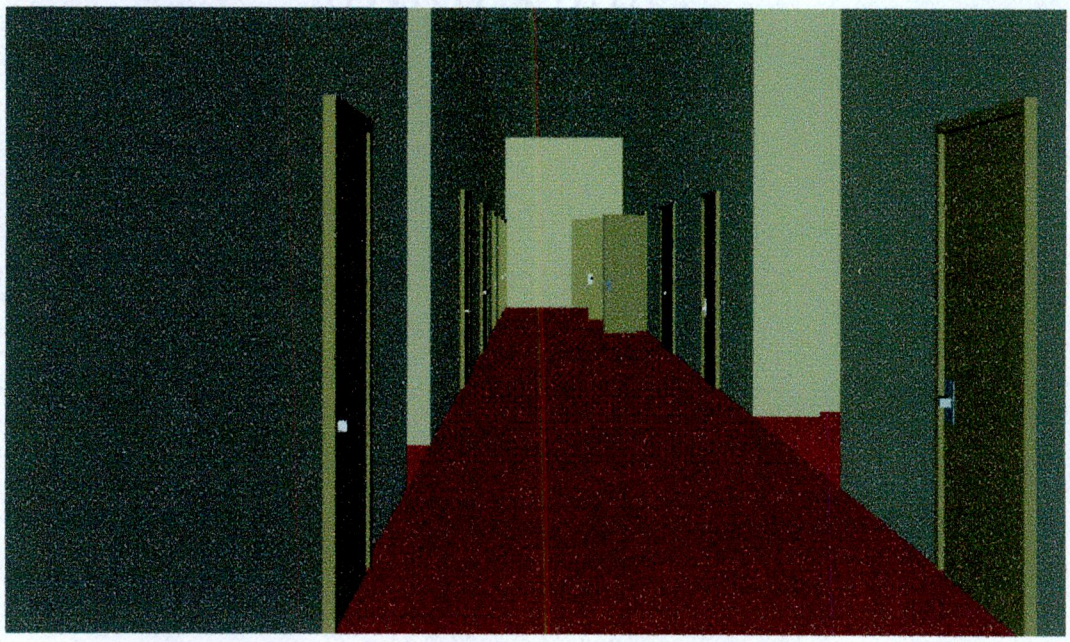
and breathing constitute an interactive surface that, while moving the body in the immersive space, simultaneously alter the physiological condition and state of the body. Deep breath does not only move the 'immersant' in relation to the stereoscopic 3D space but it also brings more oxygen to the body and affects its physical and chemical balance. In the immersive environment of Osmose the border between the interface as a symbolised surface and the surface of the physiological body begins to blur.

(iii) To Change Ones Nature

Davies in her essay 'Being in Immersive Virtual Space', writes about the spaces that we, as humans, have access to throughout our lives, most people being limited to life as experienced on the surface of the earth. (Davies, 1995, p. 4) This is reflected in the design of conventional VR (fig. 13), as most designers rely on everyday experiences of terrestrial space to define the appearance of their virtual worlds. These worlds end up being filled with hard-edged objects, horizontal floors and walls. The interface methods are also based on things we experience every day, such as walking or driving. These approaches to 'immersive' virtual space limit its potential, and uphold the conventions of a western world view.



(fig. 13) Sample VR image. www.star.rcast.u.tokyo.ac.jp

Osmose being based on Davies' diving experiences is a different kind of space. Ambiguity and transparency is the dominant aesthetic of the space to that of conventional VR. Osmose does not try to 'Re-Present' a world that already exists in another place, it is a space that only exists within the programming of the computer. A quote that Davies has used is that of the philosopher Gaston Bachelard "...by changing space, by leaving the space of one's usual sensibilities, one enters into communication with another space that is psychically innovating. For we do not change place we change our nature." (Bachelard, 1969, p.206). While Bachelard was talking about immense spaces like the desert, I feel Davies has proved that it is possible for VR to be psychically transforming. In Osmose Davies was trying to transform was the Western attitude towards nature and the body.

SWIFT BROOK BOND

Chapter 3

(i) Deep V's Shallow (Davies V's Descartes)

"Deep ecology begins with unity rather than dualism which has been the dominant theme of Western philosophy." (Fox, 1984, p. 196) The central idea of deep ecology is that we as humans are part of the earth, rather than apart and separate from it. This idea is in contrast to the dominant individualism of our culture, where seeing ourselves as separate from our world makes it easier not to be bothered by what's happening in it.

Ecology refers to the relationship between organisms and their external conditions and surroundings, e.g. the environment. Deep ecology refers to a deep, fundamental questioning of views and attitudes towards nature, particularly those held by Western societies. It has become a fairly popularised ethos in the United States, but by no means a dominant philosophy shared throughout society. Deep ecology is in sharp contrast with the dominant worldview of technocratic industrial societies which regards humans as isolated and fundamentally separate from the rest of nature, as superior to, and in charge of, the rest of creation.

For thousands of years, Western culture has become increasingly obsessed with the idea of dominance of humans over nonhuman nature, masculine over feminine, wealthy and powerful over the poor, with the dominance of the West over non-Western cultures. This is reflected in the design of conventional virtual reality, where it is possible to create worlds where the user or immersent has a kind of godlike control. Deep ecological consciousness allows us to see through these dangerous illusions. It is an attempt to break down the rigid distinctions between man and the environment. Naess wanted to encapsulate a perceived problem about the impact of human populations and technology on the natural environment.

Warwick Fox in his essay "Deep Ecology: A New Philosophy of our Time?",

gives a brief but concise overview of the differences between shallow and deep ecology, which were made by Naess in his original essay. In shallow ecology figure/ground boundaries are sharply drawn such that humans are perceived as the important figures against a ground that only assumes significance in so far as its use value for humans. This figure ground boundary could be used as a metaphor when talking about Osmose, for in Osmose there is no defined ground and there are no defined boundaries. This purposeful leaving out of a ground serves simply to place the immersent in an environment, rather than dominant over it. Because shallow ecology views humans as the source of all value, the non-human world is only given instrumental or use value (e.g. as a function of survival).

Deep ecology rejects the human-in-environment image in favour of what Naess called the "relational, total field image"(Naess quoted in Fox, 1984, p.194). This total field image looks at all organisms as being just a part of the on-going cycle of the planet. In deep ecology, figure/ground boundaries are replaced by a view where as Devall put it "the person is not above or outside of nature....(but)....is part of creation ongoing"(Devall quoted in Fox, 1984). This way of viewing nature dissolves the notion of humans as separate from their environment. This is how the images in Osmose are viewed. Although Davies did not want to illustrate nature, (e.g. 're-present' something that already exists) the way of viewing the images leads to the same ideas of deep ecology. One feels one is part of that environment. Deep ecology strives not to regard mankind as the centre of existence by viewing humans as just one constituency among others in the biotic community, just one particular strand in the web of life.

Devall commented in his 1980 overview of the deep ecology movement that in deep ecology the wholeness and integrity of person/planet together with the principle of what Arne Naess calls 'biological equalitarianism' are the most important ideas. This is the idea that members of the biosphere have the same intrinsic worth.

Deep ecology has an enormous respect for many non-western views, since its philosophies have received sophisticated elaboration in Eastern spiritual traditions. This respect also extends to the entire sensibility towards being-in-the-world of some of these traditions since this often accords with the non-power-seeking sensibility of deep ecology. Some immersants of Osmose have referred to their experience as "an almost religious experience, certainly a meditation, very close to yoga." (Osmose Comments, WWW)

Patrick Marsolek in his essay 'Deep Ecology and Man-A Sacred Kinship' suggests that a new understanding of the ancients can lead to an awareness of an eco-spirituality where each level of being is linked to another with "wood and stone teaching what one can never learn from any master." (Marsolek, p.3) He quotes ancient writings "that in seeking to heal the soul you must heal the earth of which the soul is an integral part." (Marsolek p.3) But as we have seen in Chapter One it is this belief that was the original spark to Cartesianism.

William Grey raises what he calls 'misgivings' about deep ecology. He suggests that while stepping outside the human scale of experience provides an enriching and expansive perspective for reflection, it is neither relevant nor helpful for human action. (Grey, 1993, p.3) He argues that to provide a genuinely non-anthropocentric set of values, or preferences seems to be a hopeless quest. Once we eschew all human values, interests and preferences we are confronted with just too many alternatives.

The preoccupation's of deep ecology arise as a result of human activities which impoverish and degrade the quality of the planet's living systems. But these judgements are possible only if we assume a set of values based on human preferences. We need to reject not anthropocentrism, according to Grey, but a particularly short term and narrow concept of human interests and concerns. He argues that what is wrong with shallow views is not their concern about the well-being of humans, but that they do not really consider enough in what that well-being consists. He feels that we need to

develop an enriched fortified anthropocentric notion of human interest to replace the dominant short-term, sectional and self-regarding conception.

In another essay entitled 'A Critique of Deep Ecology' Grey expresses reservations about the popular call of the deep ecology movement to return to the old wisdom of non-technological cultures, which are often supposed to provide a superior basis for relating to the natural environment. It is suggested in deep ecology that we can counter materialist thrust by becoming 'future primitives', and by reinstating older and wiser systems of belief found in non-western cultures which can provide a basis for non-alienating and empathetic relationships with the natural world. It is perhaps misguided sentimentality to suppose that we can simply transplant the values and beliefs from other cultures to our own. Osmose I feel does not simply transplant philosophical ideas from one culture to another, it brings those ideas in a new medium, through a profound experience visually.

Eco-feminism or ecological feminism refers to a sensibility, an intimation, that feminist concerns run parallel to, are bound up with, or, perhaps, are one with concern for the natural world which has been subjected to much the same abuse and ambivalent behaviour as have women.

> ...we live in a culture that is founded on the repudiation and domination over nature. This has special significance for women because in patriarchal thought women are believed to be closer to nature than men. This gives women a particular stake in ending the domination of nature - in healing the alienation between human and nonhuman nature. This is also the ultimate goal of the ecology movement, but the ecology movement is not necessarily feminist.....[Because] the hatred of women and the hatred of nature are intimately connected and mutually reinforced.....feminism and ecology need each other... (Ynestra King quoted in Cheney p.1).

The claim that domination of women and the domination of nature are "intimately connected and mutually reinforcing" is a common thread that runs through eco-feminist writings according to Cheney. He believes that

feminists are attracted to deep ecology because the liberation of nature is ultimately bound up with the liberation of women. That is not to say that Osmose is trying to liberate women, it does not ignore feminist critiques of traditional Cartesian space, as does conventional VR.

(ii) The Critical View

Osmose ignores the fact that the computer technology that it uses to heal this human/nature split is the same technology that that trains fighter pilots to blow it up. Perhaps Davies is simply showing that this technology can be used in less harmful ways than military training. It is a point that Davies has not addressed in any of her writings about Osmose.

Virgina Rutledge argues that the very loveliness of Osmose is the most courageous and the most problematic aspect of the work, "it risks being dismissed as so much new-age utopian rhetoric of the sort still in vogue among some of the cyberset." (Rutledge, 1996, p. 1). Erik Davis also reports of the electronic arts scene being full of sceptical post-moderns and critical politicos, who find Osmose "simpleminded or fluffy, its entrancing organic evocations misguided and suspect"(Davis, 1996, p.3). Davis also quotes from a London art-punk technojournal called Mute, who dismissed the piece an 'electronic mushspace' and accused Char Davies of 'nature-nostalgia' and 'contrived technoblindness'. The notion that Osmose is New-Age particularly annoys Davies, claming "I am not the one who says it's a mystical work." But Davies is pleased that Osmose' evocative pixels and sound provoke something like a religious experience in some people.

Conclusion

Virtual Reality, like any other technology, is embedded in a cultural history or worldview. This world view is male gendered, patriarchal, and Christian. Religion, science, and philosophy in the West have continuously disdained and devalued the fleshed body and its material needs and preoccupations and associated it and them with women.

In Chapter One we see where this contempt for the fleshed body has come from. From Aristotle debating whether the intellect might be separate from the body, to Descartes systematic method of doubt, anything that could be called into question will be discarded. The only thing that Descartes could not doubt was that he was thinking, therefore the intellect must be above all other things. Descartes developed mathematical principles with which he clamed he would be able to construct a complete account of everything that occurs in nature. He also developed a co-ordinate system that enabled the description of three-dimensional space on a two-dimensional surface. This system (x,y, and z axis) is still in use in the computer graphics of today. It seems that the goal of conventional VR is reached when we cannot distinguish between the computer image and the real thing. According to some, the only thing that VR has achieved is the reduction of space to numbers.

VR reflects a longing to transcend the limitations of our physical surroundings, Davies believes that the long term effect of this may be to seduce us away from our bodies and ultimately from nature.

In Chapter Two we see how Davies is trying to over come this longing to leave the body, by making the body part of the piece. Conventional VR leaves the body at the door of the virtual world, the body becomes a machine to press the appropriate buttons. In Osmose the body is needed not simply to press buttons, but to travel within the space. Using breath and balance to navigate the space, one is aware of one's body. Drew Leader talks of breath

being a potent tool in overcoming the mind/body dualism. It is this awareness of the body in the space that gives the immersant the profound sense of 'being'. There is no body image within the space, the body is not represented, it is a solitary experience that leads one to look within ones self.

Chapter Three draws together the thinking of Davies with the philosophies of Deep Ecology. The central idea of Deep Ecology is that we as humans are part of the earth, rather that apart and separate from it. We are just one part of the on-going cycle of nature. Shallow Ecology on the other hand stems from the philosophy of Descartes. It sees humans as being the controllers of things. Conventional VR brings these beliefs to an extreme. Osmose challenges conventional VR and the conventions of Western culture.

The names of the worlds in Osmose are based on Heidegger's writings. But what would he have thought of VR? Richard Coyne argues that Heidegger would have had little time for a technology that tries to simulate reality by building up an experience from geometrical co-ordinates or barraging the viewer with sense data. (Coyne, 1994, p.68) He argues that Heidegger would have seen the idea of constructing reality (or its resemblance) through data as untenable. It would be as if to say "nature' is constructed, so let us re-construct it in a computer. This is one of the paradoxes of Osmose, it is not supposed to 're-present' nature, it is supposed to provoke a feeling of nature, and a feeling of being in the world. But according to Heidegger our primordial understanding of being in the world is one of undifferentiated involvement. The idea of VR is the opposite, everything in the field of view is presented to the senses. "VR is a literal enactment of Cartesian ontology", according to Coyne, "cocooning a person as an isolated subject within a field of sensations and claming that everything is there, presented to the subject"(Coyne 1994 pp.68). Everything that Heidegger suggests about our being indicates that we are not constituted like sense data receptors. Laurie McRobert, on the other hand, argues that Heidegger would have seen Osmose as a bringing forth of truth. She sees creating a digital work of art that represents nature, when 'real' nature is still all around us, as being a

'curious endeavour'. That perhaps Davies is privy to a premonition of the future, as though she has already resigned herself to, and knows that nature as we know it today will ultimately be lost, and that one day all that we will have left is what computer artists, like herself, will make for us. (McRobert, 1996, p.4)

These ideas of nature being totally destroyed have been represented in some science-fiction movies of the 1970's. 'Soylent Green' and 'Blade Runner' come to mind. In Soylent Green there is nothing at all left of nature. The earth is overpopulated and there are no natural resources left to feed the people. No one is allowed outside the walls of the city. The people are given a choice, they can experience nature for a few minutes if they give themselves up to be exterminated. The images used in a climatic scene are of nature programs that would be on current TV. In 'Blade Runner' only the very wealthy can afford 'real' animals as pets, suggesting that there is very little left in the natural world apart from humans. Synthetic animals are created to act and look like the 'real' thing, creating in essence 'virtual' animals.

We have seen how in Western culture we are already being prepared for the 'condition' of VR, through the spaces that we live in. If we are teaching ourselves now that we can experience the countryside through the window of a car that is travelling at sixty miles per hour, then it is only natural that in the future, we will teach ourselves we can experience nature through VR.

Is there a danger that Davies made the piece too well, by this I mean could people resign themselves to the fact that nature will be lost, and accept VR as the next best thing? It is a possibility, but the feeling of 'being' in a 'natural' environment and the feeling of 'being' in a virtual environment are very different things. I see VR following the male-gendered, mission orientated aesthetic for some time. But I feel Osmose is the first good 'virtual' stab at what VR can be, a meditative, contemplative space, where one can learn to appreciate what we still have in our tactile world.

Appendix

(i) Technical Information

Davies in her earlier 3D computer graphic stills worked extensively with transparency and subdued colour to break down boundaries between objects, and suggest fluctuations between figure and ground. These methods proved to be very difficult to render in real time. Some of the early 3D computer graphic stills that Davies created using these principles took over 40 hours to render. To create a sense of immersion in virtual reality, each frame needs to be rendered in 1/30th of a second. That required a speed-up of more than four million percent for each frame if Davies wanted to keep her distinctive aesthetic. To do this two main computer graphic techniques were used.

First, models with transparent texture maps were used. The models and textures were generally created to be ambiguous, such as using loose, vertical strokes to suggest the edge of a forest, or luminous flecks in the sky to suggest air. Transparent texture maps were also used to dissolve the hard edges of objects so that complex looking models could be made with relatively few polygons. The use of transparency also helped to dissolve the boundaries between objects and space. The sense of figure and ground was selectively reversed by deliberate misuse of the Z-axis, more distant objects often passing in front of closer ones, the transparency of the objects helps to keep this from being disconcerting when viewed in stereo.

The second main graphic technique used in Osmose was to fill the various worlds with many simple particle systems, soft luminous particles flow in animated streams. This, along with the textured models throughout, give the impression of being completely surrounded in enveloping space. Almost all the world spaces were created using these two techniques.

Three of the worlds were created using a simpler more linear aesthetic. First the grid which stretches into infinity, this is used to practice navigation when

the HMD is donned. The other two linear worlds are the code and text worlds. They are also made from an infinite 3D structure, the code world contains all of the 20,000 lines of code developed for Osmose, and the text world contains excerpts of relevant philosophical and poetic texts.

The software for Osmose was written with the aid of the SOFTIMAGE SAAPHIRE and Dkit development libraries, as well as SGI's Performer and GL graphic libraries. The software runs using a parallel processing model, with the usual separation of the application, cull and draw processes, as well as many more processes for computing the particle animation, and reading/writing to the various VR devices.

To render the graphics in real time in response to the movements of the immersant, a three pipe OnyxRealityEngine2 was used. Two graphics pipes were used to render independently the left and right eye views for the immersant at 20-30 fps (frames per second), while the third pipe rendered both of the left and right eye views of the stereo projection (with a frame rate of 10-15fps, since only one pipe was dedicated to both views). This ONYX was loaned by Silicon Graphics for exhibitions.

A Division Dvisior HMD(head mounted display) was used for the immersant. This device was selected for its wide field of view, because the sense of immersion is considered more important than the resolution of the images.

A Polhemus Fastrak was used to track the position of the immersants' head and the tilt of their spines.

A custom breathing vest was constructed to measure the expansion and contraction of the immersants' chests.

A variety of sound equipment was also used. A Macintosh computer controlled the various MIDI devices, receiving instructions via a serial

connection to the Onyx. A Crystal River Acoustetron was used to localise up to eight sounds in 3D space at any given time. A pair of Kurzweil samplers, an effects box and a Mackie automated mixer were also used.

The sounds used were sampled from two human voices (male and female). These samples were then processed so that they would be neither literal, nor abstract, but evocative. Some of these sounds were attached to objects in the VR space. Melodies were associated with each of the different worlds - but carefully composed so as to mesh well with each other through the transitions(Davies/Harrison).

Char Davies conceived Osmose and directed the development providing the vision and the aesthetic for the work.

Georges Mauro created the models and the animation in Osmose using SOFTIMAGE|3D.

John Harrison developed the custom software for Osmose.

Rick Bidlack and Dorota Blaszczak composed the sound.

Osmose was produced by SOFTIMAGE, 1994-1995.

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Osmose by Char Davies WWW(URL):
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Char Davies, 'Osmose' Serious Games WWW(URL):
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addendum to Virtual Ecology : The Work of Char Davies.
Thesis by Karl O'Donoghue, NCAD, 1998.

I would like to thank Char Davies for her time in replying to my E-Mail, unfortunatly her answers arrived too late to be included in the main body of the thesis.

This section is for library reference only and is not part of the body of the thesis for examination purposes.

(Dr.) Paul O'Brien
April 1998

Interview with the Artist

Karl O Donoghue: The first chapter of my thesis is about Descartes and how he has influenced Western culture and ultimately Virtual Reality. How important is Anti-Cartesianism to the creation of Osmose?

Char Davies: Very. The entire approach to the work (i.e. visual aesthetic and user interface) is based on conveying an alternative to the Cartesian worldview. My working process as an artist has been influenced by artistic investigation of my own extreme myopic vision. In 1981, a chance turning of attention to this unmediated, unfocused mode of perception led to my discovery of an alternative (non-Cartesian) spatiality whereby "objects" had disappeared, where all semblance of solidity, surface, edges and distinctions between things, and figure and ground - i.e. the usual perceptual cues by which we objectify the world - had dissolved, replaced by a sense of space in which there were no sharply defined objects in empty space, but rather an ambiguous intermingling of varying luminosities and hues, a totally enveloping spatiality, very much like that felt by a body immersed in the sea. In Osmose, and the new work, this non-Cartesian sensibility is conveyed though use of semi-transparency, ambiguity of form, flips of figure and ground, floating rather than driving, and denial of the instrumental use of hands, etc.

The title of the thesis is "Virtual Ecology: The Work of Char Davies", the overall theme is the relationship between Deep Ecology and Osmose. Do you feel the philosophical ideas in Osmose are Similar to the ideas of the Deep Ecology movement?

Yes there are certain correspondences, including the desire to challenge our culture's anthropocentric interpretation of nature as a resource to be subjugated and exploited, and to emphasise our inherent connection with the living flowing world. I have been reading environmental philosophy (including deep ecology) for many years. All my work is based on nature, and the desire to express my deeply felt belief that all notions of separation

from it are illusory (although perhaps, up to a point which we have long passed, necessary for biological survival...)

Do you feel the women have a closer relationship with nature than men?

Hard to say. Perhaps womens' close relation to their own body cycles tends to somewhat offset our enculturated alienation from the biophysical realm. But what about Wordsworth, John Muir, and many other nature loving males? It is our patriarchal culture which has historically lumped women and nature together - and devalued them as objects to be used by men. Perhaps closer to the truth is that we are all equally embedded in nature, it's just that women are less likely to forget this, especially in terms of pregnancy and child birth.

In my opinion Osmose has a feminine subjectivity, in both its interface and its visual aesthetic (i.e. it is challenging the conventional 'phallic' pointing that is common in most computer human interfaces). Is that just my reading of the piece or would you agree?

I would agree. Other people have remarked on this also. The reason that I have wished to subvert the dominant design approach to the medium is that many aspects of the worldview it carries do not jive with my experience of the world, and I see a relation between this dominant worldview and historic devaluation of the body, women and nature. There are many writers who have examined this. Unless designed to challenge conventional design approaches the medium will, by default, carry the values of the patriarchal paradigm from which it sprang (i.e. military and science).

How do you feel about the criticism outlined in the Wired magazine review of Osmose, about Osmose being created with the same technology that trains fighter pilots to blow nature up?

That is true - however the entire work is based on subverting those conventions within the medium, to offset such uses, to demonstrate that it

can be used to create environments that counter the still dominant techno-scientific worldview. Whether my work will ultimately be co-opted, (e.g. leading to more beautiful military flight simulations and shoot-em-up computer games) only time will tell. If I were to focus on that outcome too much, I would unplug and go back to painting.

Larrie McRobert in her essay 'Immersive Art and the Essence of Technology' talks about you being a sort of prophet, that one day all people will have left of nature is the images that computer artists like yourself make for them. Do you feel that there is any truth in a statement like this, or is it others peoples readings of the piece?

I don't think it is up to the artist to comment on being a prophet - only the passage of time tells that. There are however many such prophets - the environmental movement is full of them (e.g. the American poet Gary Snyder and Edward Abbey, there are many many others). Even the British poet, John Clare would fall into this category in terms of his poem about the lament of Swordy Well and the environmental implications of the coming industrial age. I spend all my free time in the countryside walking in the woods and rambling through the fields, and write now in front of a wood burning fire with dusk descending upon the hills. This is my necessary antidote and my place of grounding. If I had to choose between one and the other, I would choose this, the unfathomable non-manmade world of nature, and would happily unplug and never go near a computer again. That being said, if people read Osmose in terms of a warning or manifestation that one day simulations may be all there is, that is fine with me. While Jaron Lanier said that immersion in virtual environments might increase appreciation for the real world, I tend to think that unless the values embedded within the medium (a la Descartes) are circumvented or subverted, then this medium will only distract us from earthly responsibilities and serve to a worldview that approaches nature as a resource to be exploited, including genes. My whole approach to this is to explore how the medium can be used to "de-automatize" perception (via use of semi-transparency, floating etc) so that participants begin to question their habitual perceptions and

assumptions about being in the world, whereby Cartesian boundaries between mind and body, self and world begin to slip and become permeable.

I have been unable to find anything writen about the piece that you are working on at present. Would you be able to tell me how this new piece is different from Osmose?

I do not believe in publishing or publicly speaking about work before it is complete. Osmose was a work which was based on spatial organisation of various worlds, and stasis of most elements within, (except of flowing particles) and even thought the visuals did offset the conventional "hard-edged objects in empty space" aesthetic, they still tended to be fairly literal. As well interaction was limited to navigation and ambiguous perceptual readings of gestalt-like compositions dependent on participant location (with the exception of the fully-interactive sound) . While using many of the techniques we developed for Osmose, including semi-transparency and spatial ambiguity, and an interface based on breath and balance, the new work Ephemere is an attempt to develop structure and metaphor based primarily on time rather than space. In this context, emergence and transformation of form, and ebb and flow of visibility and audibility within the environment are very important, as is further de-objectification and literalness of form. We are working on developing more fully interactive or rather inter-responsive relationships between the various elements and the participant - all of which should contribute an experience of ephemerality within the work.

This interview took place via E-Mail.

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