

DIGITAL ART

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Chapter 2: Digital Technologies as a Medium

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Virtual reality and augmented reality

Like the word 'cyberspace', the term 'virtual reality' (VR) is now commonly used for any space created by or accessible through computers, ranging from the 3D world of a game to the Internet as an alternate 'virtual' reality constructed by a vast networked communication space. The original meaning of VR, however, referred to a reality that fully immersed its users in a three-dimensional world generated by a computer and allowed them an interaction with the virtual objects that comprise that world. The term was coined by Jaron Lanier, whose company VPL Research, founded in 1983, was the first to commercially introduce immersive virtual reality products. Among these products were a glove device for interaction with virtual worlds (1984), head-mounted displays that enabled users to enter 3D worlds (1987), and a networked virtual world system (1989). VR is the most radical form of insertion of a user into a virtual environment (or vice versa), since it puts the screen right in front of the viewer's eyes through a headset or glasses, immersing the user in an artificial world and eliminating or augmenting the physical one. Full immersion into a simulated world that allows users to interact with every aspect of it is still more of a dream than a reality, although the technology has made considerable advances. Entertainment parks with elaborate gaming scenarios that make use of force-feedback devices—which translate phenomena and actions in the virtual world into a physical sensation for the user—are among the most advanced experiments in this direction. On one level, this form of virtual reality constitutes apsychology ofdisincarnation. since it ultimately promises the possibility of leaving the obsolete body behind, and inhabiting the datascape as a cyborg. From this point of view, virtual reality is the manifestation and continuation of a flight from the body that has its origins in the fifteenth-century invention of linear perspective vision. However, the concept of disembodiment radically denies the physicality of our bodies and the reality of our interaction with computers, which still very much is a physical process that in many ways forces us to conform to the set-up of a machine (e.g., wear a headset).

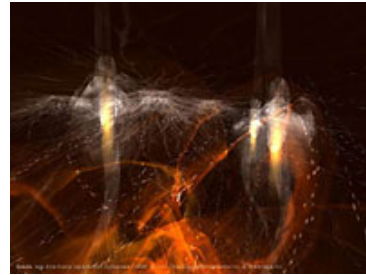
Issues of embodiment vs. disembodiment and the perception of space obviously play a central role in the artistic explorations of virtual reality. Only a few' virtual-reality environments that completely immerse a viewer into an alternate world have been developed within an art context, and Canadian artist Charlotte Davies's (b. 1954) *Osmose* (1995) and *Ephémère* (1998) are classics of the genre. In *Osmose*, 'immersants' enter a virtual world by means of a head-mounted display and a motion-tracking vest that monitors the wearers breathing and balance. The world first presents itself as a three-dimensional grid that introduces coordinates for orientation. The breathing and body balance of the system's users transport them into a forest and other natural environments.



109. Charlotte Davies, *Osmose*, 1995

One of the extremely effective strategies Davies employs is to avoid representational realism in the creation of

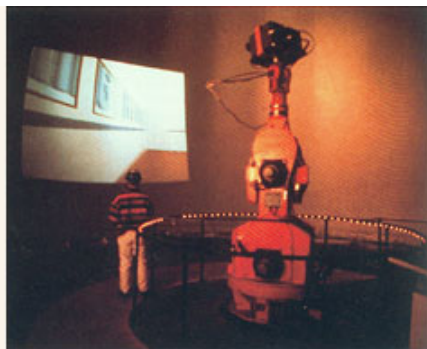
her worlds: although the environments are partly representational, they also have an element of translucency and use textures that suggest a constant flow of particles. Painterly in its sensibility, *Osmose* creates a myopic vision of a dream world. Apart from natural surroundings, the VR environment of *Osmose* also includes a layer of 'Code' and 'Text', which illustrate, respectively, the software on which the work is based and quotes from the artist's own writings and texts on technology, nature, and body. The more abstract meta-layers frame the natural environments in the context of a dataspace.



110. Charlotte Davies, *Ephémère*, 1998.

Like *Osmose*, this work is based on natural worlds, but it uses a vertical structure to distinguish between three main levels (landscape, earth, and interior body). It features body organs and blood vessels as organic worlds, and a temporal layer is introduced through the change of seasons and different life-cycles. *Ephémère's* inclusion of an 'interior body' realm blurs the boundaries between the subject and its surroundings, seemingly turning the body inside out (or collapsing it onto itself) and allowing immersants to enter it. Davies's projects radically challenge traditional notions of embodiment and the body's connection with its physical environment by immersing viewers in a virtual world driven by their own body and breathing

The predominantly software-based level of immersion and embodiment developed in Davies's work is still unusual among the VR environments developed in an art context. Most artistic VR projects make use of physical structures in order to create the immersive effect of their virtual worlds. In Jeffrey Shaw's *EVE* (1993), the environment consists of a large inflatable dome with two video projectors on a robotic arm at its centre, which can fluidly move projected images over the inside of the dome. The images are presented as a stereo pair, so that viewers—wearing polarizing glasses—encounter a three-dimensional world. This world is in turn influenced and manipulated by one of the viewers who wears a helmet that tracks the position and angle of its wearer's head and controls the positioning of the projectors. The view of the scenery consistently corresponds to the viewer's point of view. In this case, the virtual reality is a multi-user environment where only one of the immersants is the navigator, while the others are subjected to the chosen view. The control over perspective that is usually the photographer's or director's domain is therefore placed into the hands of one 'viewer'.

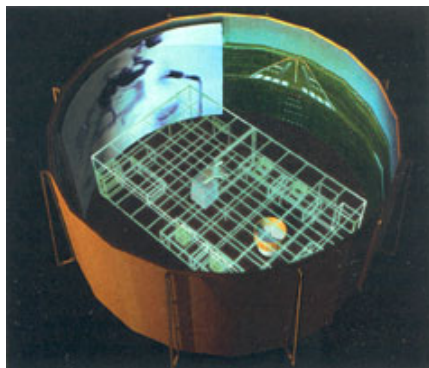


111. Jeffrey Shaw, *EVE*, 1993.

The original *EVE*, which stands for 'Extended Virtual Environment', was subsequently adapted for different scenarios. In one manifestation, *The Telepresent Onlookers* (presented at ZKM in Karlsruhe, Germany, in 1995), the projectors inside the dome were linked to cameras outside, transposing the exterior into the interior space.

Issues of embodiment and the relationship between body and space also play a crucial role in *ConFIGURING the CAVE* (1996) by Shaw, Hungarian-born Agnes Hegedüs (b. 1964), and German Bernd Lintermann (b. 1967). The project employs the CAVE (Cave Automatic Virtual Environment, or Computer Automated Virtual Environment), which was conceived by Americans Thomas DeFanti and Dan Sandin in 1991. Working at the Electronic Visualization Laboratory (EVL) at the University of Illinois in Chicago, they developed the environment with several collaborators and first presented it at the 1992 SIGGRAPH, the annual convention of the Special Interest Group for Graphics of the Association for Computing Machinery. Reproducing visual cues used by the brain to interpret the world, the CAVE produces stereoscopic imagery by means of four rear-projected screens and an active stereo system. The name of the environment alludes to the famous cave allegory introduced by Greek philosopher Plato in his *Republic*. Plato used the image of prisoners in a cave who define the basis of their reality through the shadows of fire dancing on the walls of the cave to develop concepts of reality, representation, and human perception. *ConFIGURING the CAVE* creates its immersive environment through projections on three walls and the floor and allows viewers to interact with it by means of an almost life-size wooden puppet. The puppet functions as the immersants' avatar and enables them to affect imagery and sound through moving the wooden mannequin's limbs and body.

A more conceptual and historically oriented exploration of virtual reality unfolds in Agnes Hegedüs's *Memory Theater VR* (1997). Combining four different virtual worlds, the project consists of an interactive film—focusing on the history of illusionary visual space—that is projected onto a circular enclosure. The interface for interacting with the piece constitutes a doubling of the situation, again reflecting on illusion in space. Hegedüs's project establishes an explicit connection to the old concept of the memory theatre, which has experienced a revival in the digital age since it outlines the basic concepts of information space and architecture. The idea of an 'information space' dates back centuries and is closely connected to the ancient concepts of the memory palace and mnemonic techniques developed in rhetorics. In the second century BCE, the Roman orator Cicero imagined inscribing the themes of a speech on a suite of rooms in a villa, and then delivering that speech by mentally walking from space to space. At the basis of this technique is the realization that our memory works in a spatial way. In the sixteenth century, the images and techniques used in memory systems were further developed into sign systems and physical structures that were supposed to function as portals to a transcendental knowledge of the world. Extrapolating the idea of the memory palace, Grulio Camillo (1480-1544) constructed a memory theatre, a wooden structure that was displayed in Venice and Paris. The structure consisted of pillars inscribed with images, figures, and ornaments that supposedly contained the knowledge of the universe and were intended to enable visitors to converse on any subject no less fluently than Cicero. Hegedüs's *Memory Theater VR* combines these and other precedents of imagined space into a reflection on the history of 'virtual reality'.



112. Agnes Hegedüs, *Memory Theater VR*, 1997

As well as immersive VR environments, there is also a category of work that creates complex three-dimensional worlds that do not necessarily make use of a specially constructed environment but take the form of a more traditional screen projection. *Beyond Manzanar* (2000) by American Tamiko Thiel and Iranian-American Zara Houshmand is an interactive 3D world based on the actual location of Manzanar, the first of more than ten internment camps built to incarcerate Japanese-Americans during World War II. The life-size image of the 3D space is projected onto a wall within a darkened space, and viewers navigate and change the viewpoint by means of a joystick on a pedestal. Archival photographs from the internment camp are juxtaposed with Japanese scrolls and paintings in a constantly shifting environment that—reacting to the viewers' presence

—illustrates a chasm of cultural identity, contrasting a dream world of cultural heritage with a reality of political injustice. The juxtaposition of simulated worlds in a political context also becomes its core element in Peter D'Agostino's *VR/RV: A Recreational Vehicle in Virtual Reality* (1993). D'Agostino has been working in video and interactive multimedia for decades and created numerous works addressing issues of politics and identity. *VR/RV* is a projection of a 3D world that simulates a travel along the electronic superhighway (in the literal sense) by joining scenes from Philadelphia, the Rockies, Kuwait City, and Hiroshima—experienced from the inside of a computer-generated car. Mixing the scenery with the 'soundtrack' from the constantly scanning car radio as well as CNN broadcasts, the project becomes a reflection on the increasing mediation of our world and the way it is shaped by technologies. Hiroshima and Kuwait, in particular, point to the military use of technology, which again is closely connected to the mediation of war. In both *Beyond Manzanar* and *VR/RV*, virtual reality is not used to create a seamless alternate world but to create a clash of the 'realities' of physical location and perception. The investigations of these projects and of immersive virtual reality in digital art may still be in their beginning stages — where the state of the technology lags behind the concepts being explored - but they point to a probably not so far future where virtual reality may become a second nature that profoundly challenges the basis of our concepts of perception and the dualism of 'flesh' and 'spirit'.



113. Tamiko Thiel and Zara Houshmand, *Beyond Manzanar*, 2000.

Not a photorealistic environment, this work combines the aesthetics of computer games with the techniques of stage design. Viewers move through a landscape consisting of shifting layers and creating alternate realities: opening the door in a building of the camp, they may find themselves in a Japanese paradise garden that suddenly disappears if they try to enter; following a road, they may find their way blocked by barbed wire.