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Virtual Reality
The Interplay Between Technology, Ontology and Art

Höher als die Wirklichkeit steht die Möglichkeit.

Introduction

In their millennia-old histories art and technology have always been closely related. It has often been pointed out that the Greeks used the same word – *techné* – for craft and art and called the craftsman and the artist by the same name: *technites*. Like the craftsman, the artist in his creation is dependent on (the mastery of) specific tools. Even the prehistoric artist depended on specific technical knowledge (for example the reddening of yellow pigments found in the cave by burning them), and made use of ingenious tools to engrave and paint figures on the cave walls. Although since Greek culture art and technology have gradually gone their separate ways, the modern artist is obviously no less dependent on technological tools than his prehistoric predecessor. We might even say that artists today, extensively using photography, film, synthesisers, samplers and computers as their tools, are even more than ever dependent on technology. This is especially obvious in the case of virtual reality. It has even been suggested that in virtual reality (VR) art and technology are coming back together again (Pimentel and Teixeira 1993, 229). As Michael Heim states in his book *The Metaphysics of Virtual Reality*: »Perhaps the essence of VR ultimately lies not in technology but in art, perhaps art of the highest order. Rather than control or escape or entertain or communicate, the ultimate promise of VR may be to transform, to redeem our awareness of reality – something that the highest art has attempted to do and something hinted at in the very label *virtual reality*, a label that has stuck, despite all objections, and that sums up a century of technological innovations« (Heim 1993, 124).

In order to elucidate the ontological dimension of art and technology that Heim is aiming at, it is worth recalling Heidegger's remark on *techné* in *The Origin of the Work of Art*. Although Heidegger admits that the reference to the Greek practice of calling craft and art by the same name is convincing to a certain extent, he immediately adds that this reference remains oblique

and superficial. According to Heidegger the Greek *techne* signifies neither craft nor art, and certainly not technicality in the present-day sense. In Greek culture *techne* doesn't mean a kind of practical performance, but rather a mode of knowing: »For Greek thought the nature of knowing consists in *aletheia*, that is, in the uncovering of beings. It supports and guides all comportment toward beings. *Techne*, as knowledge experienced in the Greek manner, is a bringing forth of beings in that it *brings forth* present beings as such beings *out of* concealedness and specifically *into* the unconcealedness of their appearance; *techne* never signifies the action of making« (Heidegger 1975, 59). Considered from the point of view of modern aesthetics, which strongly emphasises the role of artist's originality and authenticity in the »bringing forth of beings«, Heidegger in this statement seems to underestimate the artist's contribution to the realisation of the work of art. However, true as this may be, Heidegger rightly points at a dimension of the work of art that, just because of the modern emphasis on the creative artist, has been largely neglected in modern aesthetics: the fact that a work of art discloses a world. This disclosure of a world by a work of art is not a kind of representation, but rather an evocation: »A building, a Greek temple, portrays nothing. It simply stands in the middle of the rock-cleft valley. The building encloses the figure of the god, and in this concealment lets it stand out into the holy precinct through the open portico. By means of the temple, the god is present in the temple. This presence of the god is in itself the extension and delimitation of the precinct as a holy precinct. The temple and its precinct, however, do not fade away into the indefinite. It is the templework that first fits together and at the same time gathers around itself the unity of those paths and relations in which birth and death, disaster and blessing, victory and disgrace, endurance and decline acquire the shape of destiny for human being. The all-governing expanse of this open relational context is the world of this historical people« (Heidegger 1975, 42).

In order to understand the intimate relationship between the ontological 'working' of art and technology, it is necessary to consider the fact that the way a work of art discloses a world cannot be isolated from the technologies used in the different artistic disciplines. The way a work of architecture (like the Greek temple mentioned by Heidegger) discloses a world, differs essentially from the way this happens in a painting, a tragedy, a dance or in a piece of music. But even works within one artistic discipline can have quite different modes of disclosure. An example taken from the visual arts may elucidate this. The way Van Gogh's painting of a pair of peasant shoes (a second example Heidegger mentions in his text) discloses a world, is essentially different to the way this happens in a photograph or

in a digitally synthesised image of a pair of shoes. These three different techniques of two-dimensional representation express different implicit ontologies or world views and as such are part of three succeeding epochs in the history of (the understanding of) Being (cf. De Mul 1997).

In my contribution I want to break some ground for an analysis of how artworks that make use of VR technology disclose worlds in their own way. I will present my analysis of the implicit ontology of VR along the axes of technology, ontology and art. Together these three axes enable us to develop a deeper insight in the essence of VR.¹

Technology

From a sheer technological point of view, virtual reality (also known as virtual environments, artificial reality, virtual space, or immersive media) can simply be described as the most recent offshoot of the development of (ever more user-friendly) man-computer interfaces.² It can be defined as »a

¹ Obviously I do not claim that these three axes offer a complete understanding of the nature of VR. Like any other technology, VR is the result of a complex interplay of various technical, scientific, military, socio-economic, (sub)cultural, ideological and philosophical factors. Far from being an isolated domain, VR (especially in its networked variants: virtual agora's, malls and communities) is part of a broader societal development that is characterized by a decline of urban communal space and the infiltration of the life-world and society with virtual technologies like television, radio, video, portable stereos and mobile telephones (Ostwald 1997, 126-7) and is strongly supported by the emergence of 'informational capitalism' (Castells 1996, 361, 366). Many authors have pointed at the male-gendered, North-Atlantic and colonialist ideology of many VR-applications or even of VR technology as such (Dietrich 1997; Hayles 1996; Kramarae 1995; Penny 1994; Stone 1995; Vasseleu 1997; Wise 1997). Moreover, as has already been suggested in my introduction, VR is the (tentative) culmination of a specific tradition of artistic representation, in which the central perspective from Renaissance painting, the realism of photography, the immersion of panoramas and the movement of film are combined (Hayward and Wollen 1993; Penny 1994). Others have pointed at the strong influences of sub-cultures such as the psychedelic counter-culture of the sixties, the successive popular music cultures from rock to house with their accompanying audiovisual practices, New Age mysticism and science fiction, especially of the cyberpunk that originated in William Gibsons 1984 novel *Neuromancer*, in which the idea of 'jacking in' to cyberspace, as well as the term 'cyberspace' was introduced (Hayward 1993; Ziguas 1997). Moreover, the development of VR is characterized by the dualism of an important tradition in Western religion and philosophy, represented by Plato, Christianity and Descartes. (Heim 1993, 83-108; Penny 1994).

² The term 'virtual reality' was introduced in 1989 by the computer-aided design software company Autodesk and the eclectic computer company VPL and became a 'hot' topic

three-dimensional, computer generated, simulated environment that is rendered in real time according to the behaviour of the user« (Loeffler and Anderson 1994, xi). As such it succeeds the two-dimensional graphical user interface of the MacIntosh and Windows operation systems, just as this two-dimensional interface replaced the one-dimensional command-line prompt of DOS, Unix and other early systems. Whereas in the case of DOS you remove a file from your computer by typing in the command 'delete' and in the case of a MacIntosh or a Windows computer you do this by dragging a two-dimensional representation of this file with the help of your mouse to a two-dimensional representation of a wastepaper basket, in the case of a VR interface you take up a three-dimensional representation of the file in your hand and throw it in the virtual basket next to your chair.

Although VR is still in its infancy, the three elements that together constitute the VR-experience are already present in the current VR systems (cf. Aukstakalnis and Blatner 1992, 23; Lavroff 1992, 9-13). The first element is *immersion*. In a VR system the user is not merely observing the data presented by the computer through a window, but is experiencing an alternate reality from the inside. In the present VR-systems the experience of immersion is mostly evoked by the use of a head-mounted display, with binocular parallax displays and stereo earphones to create 3-D optical effects and sound. In still experimental VR systems laser light is used to project images immediately on the retina. Even more experimental are the attempts to connect the computer immediately to the brain in order to evoke the images and sounds (and perhaps also tactile and olfactory sensations) electronically. VR systems share the element of immersion with older modes of representation like the panorama or theme park attractions such as StarTours in Disneyland Paris.

The second element of the VR experience, which distinguishes VR from these older modes of representation, is *navigation*. Navigation is the ability to move about in the computer-generated environment. Whereas in a traditional panorama and in Disneyland's StarTours the position of the viewer is fixed, in the case of VR the 'visitor' can navigate through the virtual environment and view it from different perspectives. This is made possible

in the media soon afterwards. However, the technology itself has a somewhat longer history. From 1969 onwards, the artist Myron Krueger developed a series of multi-sensory environments, that could interact with the visitor by using pressure-sensitive floorpads and infrared lights and which he called artificial reality. The head-mounted displays built by Ivan Sutherland, also in the late 1960s, were the first precursors to current VR-systems and were further developed in military and aerospace applications in the 1970s and 1980s and in the game industry in the 1990s (Chester s.q.; Coyle 1993).

by (mechanical, ultrasonic, magnetic, or optical) position/orientation tracking devices in the outfit of the cybernaut that instruct the computer, which part of the environment to display when the user moves his body or his head. Of course, navigation by the user only goes as far as the computer program allows. You can only explore locations that are pre-programmed and stored in the computer's memory.

The third and perhaps most innovative element of VR, compared to all foregoing types of representation, is that it allows the user to *interact* with the virtual environment. This means that the user, thanks to input devices such as datagloves or datasuits, can manipulate the objects in the virtual environment which respond appropriately. Moreover, virtual agents can act upon the user, or better: on the *representation* of the user (these 'virtual bodies' are usually called 'avatars' or 'personae'). In instances where more than one user is simultaneously immersed in the virtual environment, it becomes a shared world, in which their avatars can also interact with each other. In the popular arcade game *Dactyl Nightmare*TM, for example, the players try to accumulate as many points as possible by shooting at and hitting the avatar of the other players. In doing so, they are constantly threatened by a virtual pterodactyl, which attempts to pick up these avatars and kill them by dropping them down.³

As the (almost) real time rendering of images and sounds requires very powerful processors and a huge storage capacity, most VR systems today are implemented in specially designed and therefore very expensive stand-alone computers. However, in principle VR can be implemented in computer networks as well. Interesting examples are virtual worlds such as *Alphaworld*, which are emerging on the Internet. Although these virtual worlds (still) lack the element of full immersion (the inhabitant merely looks at them through his computer 'window'), they enable the 'inhabitant' to navigate through this environment with the help of his avatar, cultivate his virtual estate, and interact with other inhabitants. In these virtual worlds the users are not only visiting a pre-constructed environment, but become the (intuitive) co-programmers of this environment, too.

The environments VR technology gives access to are not necessarily completely virtual. It is also possible to mix them with 'real' environments. This happens for example in augmented reality and telepresence systems. An example of an augmented reality system is the helmet of a pilot where additional information about the environment is displayed on the inside. The pilot finds himself situated in a multi-layered environment that combines

³ For a more detailed phenomenological description of the experience *Dactyl Nightmare*TM see (Green 1997).

virtual and real elements. In the case of telepresence systems, the head-mounted display and datagloves or datasuit are connected with a robot in another real location, which acts as the avatar. The user perceives the remote environment with the help of the 'senses' of the robot, and uses the robot's 'limbs' to navigate through this location and to interact with the things he finds there. This way a fireman could virtually go into a burning house to rescue its inhabitant or a scientist could virtually walk on Mars or move between molecules. VR, augmented reality and telepresence can be mixed in a number of ways. Hans Moravec of the Robotics Institute of Carnegie Mellon University, for example, imagines a hybrid system where a virtual 'central station' is surrounded by portals that open on to views of multiple real locations. While in the station one inhabits a virtual body, but when one steps through a portal, the harness link is seamlessly switched from the simulation to a telepresence robot waiting at that location (Moravec 1995).

In some respects VR itself might be called a virtual technology. On the one hand, the systems available at present are still far from being a realisation of the promises and dreams of their builders and savants. Although we may expect that VR technology will show impressive improvements in the next decades, some of the promises and dreams projected in VR will certainly remain virtual forever, as they are based on an inadequate understanding of VR. On the other hand, VR is a virtual technology in the sense that we do not yet seem to grasp its unique potentials. VR still is in search of its own distinguishing 'grammar'. We might compare this situation to that of film in its formative years. Only with the invention of montage did film acquire the specific grammar that has made it a unique way of disclosing the world. As in the early days of film – consider Vertov's *Man with the Camera* – many artists today are investigating this ontological dimension of VR in their work (see Loeffler and Anderson 1994; Moser and MacLeod 1996).

Although we cannot predict the future development of VR, we can tentatively explore its ontological potentials by studying the way the present VR systems disclose a world. In addition, this will enable us to consider some of the implications of VR as an artistic medium.

Ontology

Prior to my analysis of the ontology of virtual reality, I have to say a few words about the meaning of the word 'ontology'. I use this word in the sense it was introduced by Heidegger in *Sein und Zeit* (Heidegger 1979, hereafter cited as SuZ). Ontology has to do with the Being of beings, that is:

the way beings appear to us, human beings (or, in Heidegger's terminology: human *Dasein*, a term that indicates the awareness of Being that characterizes human existence). This notion of ontology presupposes an ontological difference between (on the ontic level) individual *beings*, that are independent of the experience by which they are disclosed (e.g. rocks, computers, trees, animals, humans, gods), and their (ontological) *Being*, which 'is' only in the understanding of these beings by man (SuZ 183). Although beings are independent of human existence in the sense that they are not constituted by the human subject – and for that reason Heidegger, contrary to Husserl, might be called a 'hermeneutic realist' (Dreyfus 1991, 255) –, their Being is not. For that reason Heidegger in *Sein und Zeit* regards the analysis of human existence as the fundamental ontology on which all regional ontologies (of nature, history, art, etc.) are grounded.

Probably this clarification of the ontological difference between beings and their Being, and the related analysis of the problems of traditional ontology that result from the neglect of this difference are Heidegger's most important contributions to philosophy. In traditional ontology Being and human beings (*Dasein*) were mainly conceived of as if they were beings. Being was conceived of as the highest being and ground of all other beings (e.g. the Idea of the Good in Plato's philosophy or God in the Christian tradition). And human being was also considered from the perspective of beings as a being with specific characteristics that could be determined. Contrary to this view Heidegger argues that human existence is a concerned Being-in-the-World. *Dasein* is not the isolated *ego*, which Descartes described, but is always already bodily in the world, dealing with the beings it encounters there. In this context the concept 'World' is not an ontic term referring to the totality of beings, but an ontological concept, pointing towards the (not necessary explicit) meaningful totality of relationships between *Dasein* and the available (*zuhanden*) beings. World is not an object opposite to a subject, but a structural aspect of *Dasein*. Correspondingly, other persons are part of *Dasein's* Being-in-the-World too. *Dasein's* being is a Being-With and its World is a common environmental whole (SuZ, 120).

This concerned and bodily Being-in-the-World with others has a specific temporal and spatial structure. *Dasein* is not in time like, for example, a rock; it is temporal in the sense that it is a *project* that is always pressed forward into future possibilities. *Dasein* is a *Seinkönnen*, a potentiality to be (*Möglichkeit*). At the same time these possibilities are not infinite in number, but determined by the situation *Dasein* is always already in, the *thrownness* or facticity of his existence. *Dasein's* spatiality cannot be understood as simply having a location within an objective space among other beings. Spatiality

rather is a function of bodily Being-in-the-World: »Only to the extent that beings are revealed for *Dasein* in their dis-stancedness, do 'remotenesses' and distances with regard to other things become accessible in intraworldly beings themselves« (SuZ 105).⁴ From the perspective of Heidegger's fundamental ontology objective time and space as they are conceived in the natural sciences are deficient modes of the temporal and spatial structure of *Dasein*'s concerned Being-in-the-World.⁵

What I wish to argue here is that Heidegger's fundamental ontology can help us in our attempt to grasp the ontological dimension of VR. It can help us understand VR as a specific mode of *Dasein*'s bodily Being-in-the-World, with a specific temporal and spatial structure. I have to add immediately, however, that the analysis in *Sein und Zeit* also raises two serious obstacles to this attempt. In the first place Heidegger in *Sein und Zeit*, in spite of his emphasis of the temporality of *Dasein*, seems to present the existential structure of *Dasein* as a timeless structure, leaving hardly any room for an analysis of alternative modes of Being-in-the-World other than deficient modes. In the second place, in *Sein und Zeit* Heidegger, although extensively examining the role of instruments such as hammers in *Dasein*'s disclosure of World, barely pays attention to *modern* technology. One might wonder whether the work of Heidegger after his famous *Kehre* is not better equipped for this task, because here the temporality (that is: the epochal character) of the understanding of Being as well as the role of modern technology plays a prominent role. However, the fact that in this later work – for reasons I cannot deal with here – the emphasis also moves from the projectivity of existence to the thrownness (now conceived of as *Ge-schick*), the later work prevents us from grasping the projective character of VR. Therefore I suggest to approach VR from the projective perspective of the fundamental ontology of *Sein und Zeit* with a simultaneous attention for the epochal and technological dimension of Being-in-the-World. What is needed, then, is a phenomenological description and interpretation of the different structural aspects of *Dasein*'s Being-in-a-virtual-World, such as virtual embodiment, virtual Being-With, the spatial and temporal structure of virtual worlds and their specific worldliness.⁶

⁴ »Das Zuhandene des alltäglichen Umgangs hat den Character der *Nähe*. Genau besehen ist diese *Nähe* des Zeugs in dem *Terminus*, der sein Sein ausdrückt, in den 'Zuhandenheit' schon angedeutet. Das 'zur Hand' Seiende hat je eine Verschiedene *Nähe*, die sich nicht durch Ausmessen von Abständen festgelegt ist. Diese *Nähe* regelt sich aus dem umsichtig 'berechnenden' Hantieren und Gebrauchen« (SuZ 102).

⁵ For a more detailed exposition of Heidegger's fundamental ontology see my forthcoming book *The Tragedy of Finitude* (De Mul 1999b).

⁶ In his Heidegger inspired analysis of the ontology of digital domains Chester states

As I intend to elucidate the way VR-artworks disclose World, I will mainly focus on the spatial and temporal structure and the 'worldliness' of virtual worlds, and will only remark on other aspects in passing. With regard to the way VR affects Being-in-the-World § 23 of *Sein und Zeit* provides us with a clue. In the context of the spatial dimension of Being-in-the-World, Heidegger emphasises that *Dasein* is characterized by a typical tendency to nearness (*»eine wesenhafte Tendenz auf Nähe«*). He remarks: »All the ways in which we speed up things, as we are more or less compelled to do today, push us on towards the conquest of remoteness. With the 'radio', for example, *Dasein* has so expanded its everyday environment that it has accomplished an expansion and devastation of the everyday 'world' – a de-severance which, in its meaning for *Dasein*, cannot yet be visualised« (SuZ 105). Heidegger talks about a devastation (*Zerstörung*) of the everyday world because the radio disorders the relationship between physical and human nearness. A voice we hear on the radio or on the telephone can be nearer to us than the receiver. In the case of immersive, navigational and interactive technologies such as VR and telepresence the notions of nearness and remoteness undergo an even more radical expansion and devastation.

At the *ontic* level networked VR and telepresence-technology are, like the radio and telephone, part of the process of *globalization*, that is: »the compressing of time and of time costs in relation to spatial displacement, as well as the meaning and effects of such displacement« (Binsbergen 1997, 2). Because of the specific properties of the earth's surface and the mobility of *homo sapiens*, we may say that the global displacement of people, ideas and goods is as old as humanity itself. From an *ontological* point of view we might add that this process of globalization ultimately is grounded in *Dasein's* tendency to nearness and de-severance. However, in the age of modern technology this process shows a striking acceleration and radicalization. As the cultural anthropologist Van Binsbergen states it: »When messages travel at the speed of light across the globe using electronic media, when therefore physical displacement is hardly needed for effective communication yet such

that the spatial metaphors to denote digital domains (like the metaphors of cyberspace, desktop, and Electronic Superhighway) are misleading, because these domains are not spatial at all. He is certainly right in asserting that computers rather eliminate space by »encoding logical and physical entities as symbolic, addressable signs« (Chester 1997). However, as he notices himself, in order to function within a human context, computers not only have devices to convert the spatial analogue to the non-spatial digital (keyboards, mice etc.), but also devices to reconstitute the analogue (screens, display's, speakers). Although digital domains are not spatial themselves, from the perspective of *Dasein*, the immersion in a digital domain certainly has a spatial character.

displacement can be effected within one or two days from anywhere on the globe to anywhere else, and when the technology of manufacturing and distribution has developed to such levels that the same material environment using the same objects can be created and fitted out anywhere on the globe at will – then we have reduced the fees that time and space impose on the social process, to virtually zero« (Binsbergen 1997, 3). In the age of information and communication technology, especially in the case of telepresence and networked VR, *Dasein*'s tendency to nearness undergoes a radical change, which has no less radical ontological implications.

Let me first elucidate this by a closer examination of both constituents of the phrase 'virtual reality', starting with the notion of 'reality'. As noticed before, Heidegger criticises traditional ontology for understanding World and Being from the perspective of intraworldly beings. In modern ontology since Descartes being is conceived from the perspective of substantiality, and the world as a totality of things that are occurrent («vorhandener Dingzusammenhang (res)») (SuZ 201). From the perspective of fundamental ontology, however, Being (not beings) is dependent on our understanding, which means that reality (not the real) is dependent on concerned Being-in-the-World (SuZ 212). This implies that different interpretative practices can reveal different aspects of nature. From this point of view one cannot say, for example, »that the Galilean doctrine of freely falling bodies is true and that Aristotle's teaching, that light bodies strive upward, is false; for the Greek understanding of the essence of body and place and of the relation between the two rests upon a different interpretation of entities and hence conditions a correspondingly different kind of seeing and questioning of natural events« (Heidegger 1977, 117). In the context of my subject the crucial question is: how is reality interpreted and revealed by *Dasein* through virtual reality?

This brings us to the word 'virtual' in the expression 'virtual reality'. The etymology of this term offers an important clue as to why, among other candidates, this particular label for this new technology has stuck. The words 'virtual' and 'virtuality' are derived from the Latin *virtualis*. »Non-existent in classical Latin (although obviously inspired by the word *virtus* there), they are late-medieval neologisms, whose invention became necessary when, partly via Arabic versions of Aristotle's works, his Greek concept of *dynamis* ('potentiality, power, quadrate') had to be transalted into Latin (Hoenen 1947, 326n; Little, Fowler, and Coulson 1978, s.v. 'virtual')« (Binsbergen 1997, 9). After the decline of Aristotelian philosophy these concepts found refuge in the expanding field of physics. Around 1700 these concepts became established concepts in optics in the theory of the 'virtual image': the objects

shown in a mirror image, that do not really exist, but are merely illusory representations, which we apparently observe at the end of the refracted light beams connecting the object, the surface of the mirror, and our eye. A century later, the concepts became established in mechanics in theories about virtual velocity, virtual moment, and virtual work. Here the concept remains close to its Aristotelian origin and refers to entities that are not actually present, but that have the potential to become real.

In the dominant discourse on VR the meaning of 'virtual' is generally oriented towards the optic connotation of the concept. Heim, for example, defines VR as »an event or entity that is real in effect but not in fact«, and he adds: »There is a sense in which any simulation makes something seem real that in fact is not. The Virtuality game combines head-tracking device, glove, and computer animation to create the 'effect' on our senses of 'entities' moving at us that are 'not in fact real'« (Heim 1993, 109-110). Heim's remark makes clear that we cannot conceive of VR as a mere illusion. The bodily and mental sensations we experience in a flight simulator can hardly be distinguished from those experienced during a real flight.⁷ Likewise, the virtual communities such as *Alphaworld* that are currently emerging on the Internet, are real communities in the sense that they enable the inhabitants to commune and to communicate (Watson 1997). Loving or hating someone in VR is no less real than loving or hating someone in real life (RL). Of course one might object that a love affair with an avatar, a virtual crash in a flight simulator or a virtual murder in a game like *Dactyl Nightmare*TM, is quite different from a real love affair, a real crash and a real murder. This is true, of course. But it does not mean that virtual world and communities are sheer fictions. They have a reality of their own. What distinguishes VR from older forms of representation such as painting or film is that they not so much

⁷ It is often claimed that VR is a disembodied experience (see e.g. Rheingold 1991, 15-6). Heim even claims that VR is a realisation of Plato's dream to escape from the prison of the body: »Cyberspace is Platonism as a working product. The cybnaut seated before us, strapped into sensory-input devices, appears to be, and is indeed, lost to this world. Suspended in computer space, the cybnaut leaves the prison of the body and emerges in a world of digital sensation« (Heim 1993, 89). The example of the flight simulator already shows that this is not the case. Although it is true that the virtual body or avatar that we possess in a VR has an immaterial character, the very function of the VR equipment is to stimulate the senses of our *real* body. In fact, the virtual embodiment is both digital and material. According to Randall Walser, the essential difference and advantage of VR over film, plays and television is the very fact that, unlike the latter, *cyberspace embodies* (cited in: \Rheingold, 1991 #2147, 286). It is this embodiment that ensures that VR experiences do not just take place merely in the mind, but are 'felt' as well (Cooper 1997, 98). In this respect, VR experiences are real experiences.

refer to a real world beyond the representation, but constitute another type of Being-in-the-World. Describing and analyzing these characteristics of *Dasein's* Being-in-a-virtual-World, as well as elucidating the way it is connected to *Dasein's* Being-in-the-real-World, is the very task of the ontology of VR I am trying to break the ground for.⁸

Perhaps I can illuminate the contours of this ontology a little more by pointing at a striking similarity and a no less striking difference between the ontology I am aiming at and the deconstruction of representation by post-structuralists such as Baudrillard, Derrida and Lyotard. Their argument that in postmodern culture sign systems no longer refer to a reality, to a certain extent illuminates the virtuality of VR. When Baudrillard with regard to the present state of representation writes: »Simulation is no longer that of a territory, a referential being or a substance. It is the generation by models of a real without origin or reality: a hyperreal« (Baudrillard 1984, 253), then I completely agree that VR is hyperreal in the sense that it is not (necessarily) referring to an origin that precedes the simulated world. However, this is not to say that it is without reality. Baudrillard here, perhaps motivated by a kind of ontological nostalgia, seems to persist in the hierarchically valued opposition between reality and illusion that characterizes traditional ontology from Plato on. Unlike Baudrillard, we should not conceive of VR as a form of disappearance of reality, but rather as a disclosure of *another* mode of reality. I think Jaron Lanier, one of the founding fathers of VR, is aiming at this very issue when he calls VR a *postsymbolic* mode of communication. Simon Perry rightly objects that Lanier overlooks the fact that a teacup in VR is still a representation (Penny 1994, 207-8), nevertheless he does not get the point Lanier is trying to make: the fact that for *Dasein* in cyberspace the virtual teacup is not primarily a representation of something else, but a thing that is part of his concernfully Being-in-a-virtual-World. William W. Armstrong also seems to overlook this availableness (*Zuhandenheit*) of virtual beings when he argues in his Heidegger inspired analysis of the relationship between Place and Being in cyberspace: »It is true, the computer functions as a location and as such has opened up a region, a space if you will. But it is a space where there are no things, no more locations to be opened, no real relations to be opened up and brought forth in a presencing, but merely

⁸ Of course in Being-in-a-virtual-World not only the *world*, but also the characteristics of *Dasein* differ from those of *Dasein* that is in-a-real-world. Examples include indeterminate or arbitrary physique, gender and ethnicity magical powers, teleportation ability and the ability to reincarnate after a virtual death (MacKinnon 1997, 223f.). However, as already noticed, here I exclusively focus on the the impact of VR on the worldliness of the world.

images, thoughts of and references to locations left behind« (Armstrong 1994, 41).

In order to grasp more profoundly the virtuality of *Dasein*'s concernfully Being-in-a-virtual-World we should take up the second meaning of the word 'virtual' mentioned above, having the connotation of potentiality.⁹ In my concise exposition of Heidegger's fundamental ontology, I pointed to the fact that *Dasein* should not be regarded as an occurrent being, but as a *Seinkönnen*, a potentiality to be. We might say that in VR this potentiality of *Dasein* is transferred in a radical way – more radical than in everyday life – to the beings it encounters in its world. Within a virtual reality, beings are programmable according to a project by *Dasein*. One could object here, that *Dasein* entering a virtual world is not necessarily the programmer of this world. This is true. It might be useful to distinguish between what, following a distinction made by Michael Joyce with regard to hypertext, we could call *exploratory* and *constructive* VR (Joyce 1995, 39-59). In the first case, for example in the aforementioned game *Dactyl Nightmare*TM, we can navigate and interact within a virtual world, but only according to possibilities pre-established by the makers. In a constructive VR such as *Alphaworld*, however, *Dasein* becomes the programmer of his own world. Here we see a remarkable reversal of the situation in traditional ontology. Whereas in this ontology (human) Being was conceived of as if it were an occurrent being, now beings are conceived of as if they have a projective character.¹⁰ This is not only true for beings programmed within VR, but it also affects the Being of natural beings. These also increasingly become seen as programmable entities. In genetic manipulation, for example, living organisms are conceived of as programmable entities as well. Whereas mechanistic technology, as described by the later Heidegger, is characterized by control and use of beings, informationistic technology even intervenes in the creation of beings. It transforms the world into a field of virtual possibilities (De Mul forthcoming).

Does this mean that VR is the ultimate climax of modernistic will to control? In a sense it is. VR, as a computer generated environment, *literally* is the ultimate outcome of modern calculative thinking. Chester therefore

⁹ Mark Nunes, referring to Bergson, also points at this connotation in his analysis of the virtuality of the Internet: »We may need to rethink the virtual not in the commercial sense of 'more real than real', but in Bergson's sense: the condition of possibility that occurs the moment before the emergence of the actual« (Nunes 1997, 175).

¹⁰ The development of artificial intelligence and artificial life will perhaps lead to the point where non-human beings really will have a projective status – intentionality – themselves (cf. Okrent 1996; Penny 1995).

is justified in claiming that digital domains are the ultimate expression of modern technology's tendency to make the real available as *standing reserve* (Chester 1997). However, we should not forget that *Dasein* in cyberspace is not a Fichtean-like absolute I that creates and controls his world. Though the virtual body may have superhuman powers, as long as *Dasein*'s real body is part of the material world, it remains a thrown, and therefore finite Being.¹¹ Moreover, *Dasein* is also always already thrown in the virtual worlds it inhabits. This implies that the projects of *Dasein* in these worlds are no less confronted with all kinds of opposition of human and non-human other beings than in off line reality. Not only because VR is a shared world constituted by a multitude of often opposing projects, but also because the programmed worlds get their own weight and own sorts of chance and fate. And the more fundamentally *Dasein* intervenes in his world, the more fundamental is the chance that confronts him. *Dasein* remains a thrown project (*geworfenes Entwurf*), however the emphasis has changed from a *thrown* project to a thrown *project*.¹²

However, this nuance does not contradict the fact that this transformation is a radical one. Vilem Flusser states that with information technologies »we begin to liberate ourselves from the tyranny of an alleged reality. The slavish attitude, with which we, as a subject, approach objective reality in order to master it, has to give in to a new attitude, in which we intervene in the fields of possibilities in- and outside us, in order to intentionally realize some of these possibilities. From this perspective, the new technology means that we are starting to raise ourselves from a subjectivity into a projectivity. We are facing a second birth of mankind, a second *homo erectus*. And this *homo erectus*, who plays with chance, in order to intentionally transform it into necessity, may be called *homo ludens*« (Flusser 1992a, 25).

¹¹ Another important characteristic of informationistic technology, which I cannot deal with here, is that man becomes its ultimate raw material (cf. Heidegger 1967). Electronic implants and genetic engineering have begun to transform man into a transhuman or even posthuman being, whose ontological structure may be quite different from human *Dasein* (cf. Moravec 1988).

¹² I would like to thank Awee Prins for this formulation, as well for various other useful comments on an earlier draft of this paper.

Art

As play and art are closely connected (cf. Gadamer 1986, 107-174), Flusser's statement brings me to the last part of my paper, in which I will come back to the question raised in the introduction: the implications of VR for the arts. How do artworks that make use of VR technology disclose World?

In order to answer this question we have to keep in mind that traditional aesthetics is strongly influenced by the ontological tradition criticized by Heidegger. In the Platonist tradition art was primarily conceived of as a form of *mimesis* of a second order. Whereas Being was conceived as a collection of highest timeless beings (the Ideas), and the beings in the empirical world as imperfect copies of these ideas, the work of art »stands at third remove from reality«, thus offering »images far removed from the truth« (Plato 1974, 597c-605b). However, within the Platonic tradition a gradual transformation of the mimetic conception of art took place. In the work of Plotinus (*Enneads*, V, viii, 1), for example, it is claimed that works of art are not so much a representation of natural objects, but an immediate representation of the Ideas themselves. Consequently, the artist was no longer conceived of as an inferior craftsman, but as a person whose activities might be compared to those of the philosopher. From the Renaissance on, the artist has been increasingly attributed godlike qualities. Leonardo da Vinci, for example, self-confidently claimed that the artist in his work *re-creates* the living work of God. In the modern, secularised world, especially from the age of Romanticism on, the artist even took the place left by God as an originator of entirely new worlds (De Mul 1999a). This development is obvious in the development of modern art, which shows a transformation from *mimesis*, which is still dominant in impressionism, to *poiesis*. In the various avant-garde movements in twentieth-century art this resulted in a complete break with *mimesis* and realism. By means of artistic techniques such as montage, modern art »does not reproduce the real, but constructs an object (its lexical field includes the terms 'assemble, build, join, unite, add, combine, link, construct, organise [...]') or rather, mounts a process [...] in order to intervene in the world, not to reflect but to change reality« (Ulmer, 1983, 86). Although Heidegger has criticised the manifest anthropocentrism and subjectivism in modern aesthetics, his conception of art as developed in *The Origin of Art* shows an essential affinity with this romantic-modernist conception of art. Although he puts the role of the artist in perspective, in his description of the Greek temple we saw that for him too the work of art does not portray a world, but founds one.

Seen from this perspective we may say that so far VR is the ultimate outcome of this development, because in VR worlds are originated that gather people and offer them a place to live in. Especially in *constructive* VR, this technology realizes an important motive of the artistic avantgardes to transform the observer of the work into a participant. Whereas even most modern works of art remain occurent beings in the sense that they are the fixation of a projection, in constructive VR the observer really participates in the founding of World. Such virtual worlds are the *Gesamtkunstwerke* Wagner was dreaming about (cf. Heim 1993, 124f.).

Considered from this perspective, the development of art in the twentieth century shows a remarkable similarity with recent developments in the sciences. Information technology based sciences such as artificial life also reflect a transformation from *mimesis* to *poiesis*. As Claus Emmeche states it in his monography on artificial life: »Artificial life must be seen as a sign of the emergence of a new set of postmodern sciences, postmodern because they have renounced or strongly downgraded the challenge of providing us with a truthful image of one real world, and instead have taken on the mission of exploring the possibilities and impossibilities of virtual worlds. It is a case of modal sciences, passing freely between necessity and possibility. Science becomes the art of the possible because the interesting questions are no longer how the world is, but how it could be, and how we can most effectively create other universes – given this or that set of computational resources« (Emmeche 1991). Conversely, one might argue that art becomes a scientific project: »When we admit that science is a form of art, then we do not humiliate science, on the contrary, it becomes the paradigm for all other arts. It becomes clear that all kinds of art only become reality, that is: produce their realities, when they strip off their empirical skin and come close to the theoretical exactness of science. [...] Because of digitalization, all forms of art become exact scientific disciplines and can no longer be distinguished from science« (Flusser 1992b, 29-30).

As suggested in my introduction, VR in this sense indeed reunites art and technology which, since Greek culture, have gone their separate ways. Here, I will not discuss the question as to whether the development described should be considered an advantage or not. My aim has been to throw some light on this development from a philosophical perspective. Before we can judge the desirability of Being-in-a-virtual-World, we first have to understand the phenomenon. Ontologies, of course, always have de-ontological implications. But in our attempt to elucidate these implications, we have to try to avoid both uncritical embracing and pessimistic rejection of VR. VR is neither a holy grail nor »an assault on reality« (Slouka 1995). This is not to

say, however, that VR is a neutral technology. Like all technologies, VR discloses the world in its own way and as such it offers us a whole range of new possibilities and new dangers, pleasures undreamed of before and frustrations unforeseen even in our futuristic nightmares. We might also expect that some of the greatest art in the next century will be based on VR technology, and that at the same time this technology will be used for the most stultifying kitsch. We can only hope that our philosophical reflections on this technology will help us to distinguish between the two.

Literature

- Armstrong, William W. 1994. Cyberspace and the relationship between Place and Being – Is there really a place for us there? *Southwestern Philosophy Review* 10 (2):33-47.
- Aukstakalnis, S. and D. Blatner. 1992. *Silicon Mirage: The Art and Science of Virtual Reality*. Berkeley: Peachpit Press.
- Baudrillard, Jean. 1984. The Precession of Simulacra. In *Art After Modernism: Rethinking Representation*, edited by B. Wallis. New York: The New Museum of Contemporary Art.
- Binsbergen, Wim van. 1997. *Virtuality as a key concept in the study of globalisation*. The Hague: WOTRO.
- Castells, Manuel. 1996. *The Information Age: Economy, Society and Culture. Volume I: The Rise of the Network Society*. Oxford: Blackwell Publishers.
- Chester, Chris. 1997. The ontology of digital domains. In *Virtual Politics. Identity & Community in Cyberspace*, edited by D. Holmes. London: Sage.
- Chester, Chris. z.j. *Colonizing Virtual reality: Construction of the Discourse of Virtual Reality, 1984-1992*. [http](http://).
- Cooper, Simon. 1997. Plenitude and alienation: the subject of virtual reality. In *Virtual Politics: Identity & Community in Cyberspace*, edited by D. Holmes. London: Sage.
- Coyle, Rebecca. 1993. The genesis of virtual reality. In *Future Visions: New Technologies of the Screen*, edited by P. Hayward and T. Wollen. London: British Film Museum.
- De Mul, Jos. 1997. The virtualization of the world view: The end of photography and the return of the aura. In *The Photographic Paradigm*, edited by A. W. Balkema and H. Slager. Amsterdam/Atlanta: Rodopi.
- De Mul, Jos. 1999a. *Romantic Desire in (Post)modern Art and Philosophy*. New York: State University of New York Press.

- De Mul, Jos. 1999b. *The Tragedy of Finitude. Dilthey's Hermeneutics of Life*. Edited by J. Weinsheimer. New Haven: Yale University Press.
- De Mul, Jos. forthcoming. The informatization of the worldview.
- Dietrich, Dawn. 1997. (Re)-Fashioning the Techno-Erotic Woman: Gender and Textuality in the Cybercultural Matrix. In *Virtual Culture: Identity and Communication in Cybersociety*, edited by S. G. Jones. London: Sage Publications.
- Dreyfus, Hubert L. 1991. *Being-in-the-World: A commentary on Heidegger's Being and Time*. The MIT Press.
- Emmeche, Claus. 1991. *The Garden in the Machine: The Emerging science of Artificial Life*. Princeton: Princeton University Press.
- Flusser, Vilém. 1992a. Das Ender der Tyrannei. *Arch+ Zeitschrift für Architektur und Stadtebau*, Maart, 20-25.
- Flusser, Vilém. 1992b. Digitaler Schein. *Arch+ Zeitschrift für Architektur und Stadtebau*, Maart, 226-30.
- Gadamer, H.-G. 1986. Wahrheit und Methode. Grunzüge einer philosophischen Hermeneutik (WM). In *Gesammelte Werke I*. Tübingen.
- Green, Nicola. 1997. Beyond being digital: representation and virtual corporeality. In *Virtual Politics: Identity & Community in Cyberspace*, edited by D. Holmes. London: Sage.
- Hayles, N. Katherin. 1996. Embodied Virtuality. In *Immersed in Technology: Art and Virtual Environments*, edited by M. A. Moser and D. MacLeod. Cambridge: MIT.
- Hayward, Philip. 1993. Situating Cyberspace: The Popularisation of Virtual Reality. In *Future Visions: New Technologies of the Screen*, edited by P. Hayward and T. Wollen. London: British Film Museum.
- Hayward, Philip, and Tana Wollen, eds. 1993. *Future Visions: New Technologies of the Screen*. London: British Film Museum.
- Heidegger, M. 1967. *Vorträge und Aufsätze*. 3 ed. 3 Bdn. vols. Pfullingen.
- Heidegger, M. 1975. *Poetry, Language, Thought*. Translated by Albert Hofstadter. New York/Hagerstown/San Francisco/London: Harper&Row.
- Heidegger, M. 1977. The Age of the World Picture. In *The Question Concerning Technology and Other Essays*. New York: Harper & Row.
- Heidegger, M. 1979. *Sein und Zeit*. 15 ed. Tübingen.
- Heim, M. 1993. *The Metaphysics of Virtual Reality*. New York: Oxford university Press.
- Hoenen, P. 1947. *Philosophie der organische natuur*. Antwerpen/Nijmegen: Standaard Boekhandel.

- Joyce, M. 1995. *Of Two Minds: Hypertext Pedagogy and Poetics*. University of Michigan Press.
- Kramarae, Cherie. 1995. A backstage critique of virtual reality. In *Cybersociety: Computermediated Communication and Community*, edited by S. G. Jones. London: Sage Publications.
- Lavroff, N. 1992. *Virtual Reality Playhouse*. Corte Madera: Waite Group Press.
- Little, W., H.W. Fowler, and J. Coulson, eds. 1978. *The Shorter Oxford English Dictionary: On Historical Principles, revised and edited by C.T. Onions, etymologies revised by G.W.S. Friedrichsen*. 3 ed. Vol. 2 vols. Oxford: Clarendon Press.
- Loeffler, C.E., and T. Anderson. 1994. *The Virtual Reality Casebook*. New York: Van Nostrand Reinhold.
- MacKinnon, Richard C. 1997. Punishing the Persona: Correctional Strategies for the Virtual Offender. In *Virtual Culture: Identity and Communication in Cybersociety*, edited by S. G. Jones. London: Sage Publications.
- Moravec, H. 1988. *Mind Children: The Future of Robot and Human Intelligence*. Vol. 2. Cambridge: Harvard University Press.
- Moravec, H. 1995. *Interview with Hans Moravec*. <http://www.vpro.nl/views>.
- Moser, Mary Anne, and Douglas MacLeod, eds. 1996. *Immersed in Technology: Art and Virtual Environments*. Cambridge: MIT.
- Nunes, Mark. 1997. What space is cyberspace? The Internet and virtuality. In *Virtual Politics: Identity & Community in Cyberspace*, edited by D. Holmes. London: Sage.
- Okrent, Mark. 1996. *Why the Mind Isn't a Program (But Some Digital Computers Might Have a Mind)*. <http://>.
- Ostwald, Michael J. 1997. Virtual Urban Futures. In *Virtual Politics. Identity & Community in Cyberspace*, edited by D. Holmes. London: Sage.
- Penny, Simon. 1994. Virtual reality as the completion of the Enlightenment. In *The Virtual Reality Casebook*, edited by C. E. Loeffler and T. Anderson. New York/London etc.: Van Nostrand Reinhold.
- Penny, Simon. 1995. *The Darwin Machine: Artificial Life and Interactive Art*. <http://>.
- Pimentel, Ken, and Kevin Teixeira. 1993. *Virtual Reality: through the new looking glass*. Windcrest Books.
- Plato. 1974. *The Republic*. Harmondsworth: Penguin.
- Rheingold, H. 1991. *Virtual reality*. New York: Simon and Schuster.
- Slouka, M. 1995. *War of the Worlds: The Assault on Reality*. London: Abacus.
- Stone, Allucquère Rosanne. 1995. *The War of Desire and Technology at the Close of the Mechanical Age*. Cambridge: MIT.

- Ulmer, G.L. 1983. The Object of Post-Criticism. In *The Anti-Aesthetic. Essays on Postmodern Culture*, edited by H. Foster. Washington: Bay Press.
- Vasseleu, Cathryn. 1997. Virtual Bodies/Virtual Worlds. In *Virtual Politics: Identity & Community in Cyberspace*, edited by D. Holmes. London: Sage.
- Watson, Nessim. 1997. Why we argue about virtual community: A case study of the Phish.Net community. In *Virtual Culture: Identity and Communication in Cybersociety*, edited by S. G. Jones. London: Sage Publications.
- Wise, Patricia. 1997. Always already virtual: feminist politics in cyberspace. In *Virtual Politics: Identity & Community in Cyberspace*, edited by D. Holmes. London: Sage.
- Ziguras, Christopher. 1997. The technologization of the sacred: virtual reality and the New Age. In *Virtual Politics: Identity & Community in Cyberspace*, edited by D. Holmes. London: Sage.