

The Einstein's Brain Project

In relating Pliny's famous anecdote about the artist Zeuxis, that Zeuxis (painted) a picture of grapes so deftly represented that birds began to fly down to eat the painted vine, Richard Sennet comments that

"a modern reader might take this to be a story about the artist's powers of illusion. A Roman thought it showed art's relationship to reality." 1

If there is a single general expectation of the recent advances in the technologies of virtual reality and hyper-interactive simulation it is that of its capacity to present an ever-increasing realism. The quest for seamlessly reproduced worlds is paramount in the military and institutional development of the simulation technologies. The ideal (achievable or otherwise) of immersive virtual reality consists of surrounding an individual with images, sounds and behaviours so apparently like those of the real world that the body and consequently the brain is fooled into thinking it is in that world. These developing strategies are those of realism rid of expression, symbol or metaphor and they are sustained by the authorities of homogeneity and seamlessness. Just as long rendering times and their outcome of low frame rates are constantly, and expensively, fought against because they disturb the seamlessness and the effectiveness of the illusion so ruptures in the content and the consumption of the worlds are discouraged. Stopping to consider the strangeness of a sound distorted by being played too slowly or the flickering or jerkiness of an image disrupts our sense of ourselves as being in normal relations with a world. Similarly the consideration of a subtext or a hidden meaning draws attention to our consideration and away from the construction and sustenance of our normal relationship to the world. One must see these contemporary desires as linked to a history of naturalism, its concurrent dualistic pairing of reality and appearance and the authority and correctness of institutional space.

"The (Roman) people also gained from believing that their ruler's building works bore the stamp of absolute authority. To the romans we owe the phrase *teatrum mundi*, later rendered by Shakespeare as 'all the world's a stage.' A Roman could give him - or herself over to that willing suspension of disbelief which is the essence of theatre, assured that power guaranteed as consequent and correct those places in which the spectacle of life unfolded. The realm of certified stone literally set the stage for Romans believing the evidence of their eyes." 2

If the architecture of the emperors assured the propriety of those places in which the spectacle of life was revealed and in doing so presented a true picture of the world, then the contemporary architecture of simulated reality likewise sanction and fabricate a seemingly world where the normal and natural are unattached to the understanding that such things are cultural constructions.

Einstein's Brain is a collaborative, immersive, virtual reality work that explores the notion of the brain as a real and metaphoric interface between bodies and worlds in flux and that examines the idea of the world as a construct sustained through the neurological processes contained within the brain. It suggests that the world is not some reality outside ourselves, but, is the result of an interior process that makes and sustains our body image and its relationship to a world, and that the investigation of virtual reality, its potential use as a perceptual filter, and its accompanying social space is an exploration of the new constructions of consciousness and the consequent technological colonization of the body.

The image of Einstein's Brain, a reference to the human brain and to Roland Barthes' essay of the same name serves not only as a metaphor, but, also a point of entry for a participant's journey through the virtual landscapes. The figure of Einstein embodies a variety of references from the comic figure of the mad professor, to the socially conscious scientist and humanist. His name is synonymous with genius. His body seems feeble beside the awesome, mechanical power of his brain. His name invokes man's quest for the secret of the universe. His brain has passed into the world of myth, cut up and minutely examined but revealing little. The title of our project assumes a link between science and mythology, between the machine and its capacity to offer a key to the unknown and the continual re-presentation of familiar structures and myths.

In one prototype of Einstein's Brain the viewer is greeted by an image of a brain through which he or she passes gaining access to an assortment of cranial landscapes - The Forest of Vowels, Lac d'indifférence, Ville de lumières, Lenin's Falls, among others. The landscapes are linked by titles and their detail to both literary and artistic sources. Lac d'indifférence is a reference to Madeleine de Scudéry's romantic, narrative map, *Carte du tendre* which in turn refers to leading Situationist Guy Debord's detoured map of Paris, titled the Naked City, the Forest of Vowels, a wood filled with sounds derived from its topology, is a reference to the work of Nineteenth Century French Symbolist poet, Arthur Rimbaud.

Debord's map, published in 1957, and consisting of randomly collaged fragments taken from a map of Paris linked together by directional arrows, summarized the Situationists' strategy for the exploration of urban space. The map presents a garbled view of Paris, the fragments having no clear relation to each other except that of being linked by the arrows. From a text on the reverse of

the map we are told that the arrows describe the “the spontaneous turns of direction taken by a subject moving through these surroundings in disregard of the useful connections that ordinarily govern his conduct.”³ These spontaneous turns exemplify the actions known to the Situationists as *dérives*. The *dérive* (drift or drifting) and its accompanying sense of *dépaysement* (disoriented or deceived) changed the meaning of the city and its concrete social construction of space by changing the way in which it was inhabited. The original map of Paris is revealed as a seamless representation in which diversity and distinction are concealed. Debord’s *Naked City*, by contrast, is a city infinitely faceted, marked by division and difference.

The notion of the fragmented, social space of the city inhabited by the *dérive* is also found within the virtual construct. Local urban space has been rendered obsolete by the decentralizing of the information highway. As actual cities break down, more and more it is the image of the city that gains credibility and replaces the local, concrete experience. Debord wrote in *The Society of the Spectacle* that “everything that was directly lived has moved away into a representation.” In the Nineties, with this collapse of the real and the waning of direct experience the *dérive* no longer occurs in the labyrinth of the streets but within the labyrinth of images, inside the virtual world of simulation.

Similarities between the function and relationship of the brain to the body are reflected in the manner in which city and countryside are socially represented. The landscape is viewed by urban dwellers as a support system for their well being, not only on account of its physical resources but as a site for spiritual and emotion renewal. The city, on the other hand is viewed as the primary site for self-representation where prescriptions for alternative configurations and projections of future lives can be tried and tested. The city is the site which dispenses change. The image of a multi-faceted urban environment is constantly under review and subject to rapid mutation as technology develops new models of representation under the aegis of market forces, concerns with national security, entertainment and general research and development. The urban-image-feedback-loop to which we as inhabitants subscribe finds form in Antonio Damasio’s idea of dispositional representation.

Earlier images of the relationships between the urban and rural worlds were congruent with the classic, dualistic models of the mind and body. The city was the seat of ideas, of reason and culture, the countryside was signified by labour, by magic and nature. The city was at the centre of an economy where the labour and bodies of a surrounding countryside sustained the civic mind. In contrast, our current conception of life is so completely and concentratedly located in the city as to rupture the traditional relationship and cause the countryside to disappear entirely into sentimental images of the wild and of escapist rural peace. Just as contemporary life has been epitomized by the city and its identifying images to the extent that it has rendered the countryside seemingly invisible, unusable and deserted, so the concentration of self inside the chemical processes of the brain have made the body similarly invisible, uninhabited and useless.

There are examples of material environments that exist outside these considerations of the urban and rural that present an image of a world that is more consonant, more omnific, more autonomous. The chief characteristic of a rainforest is its unchanging, all enveloping, immersive nature. Its space is filled completely by the paraphernalia of plant life, its canopy blocking out the stars, its fallen leaves covering the earth. The denseness of the foliage imposes equi-distant limits to vision and constitutes a sphere. There is no horizon, no vista, no distant view. Any body moving through the forest sees the forest constantly invented at the limits of vision, springing into life as it is approached. The path already travelled disappears to be replaced by an ever more recently broken trail. Drifting without navigational aids, without enduring landmarks, without a horizon to move towards, a walker in this wood moves in a world that is constantly in flux. Any distant creature makes its existence known through sound until it suddenly comes enters the bubble of vision where it is seen at close range. Sounds intimate the existence of a world outside the bubble, but it is never seen, never tangible, never verifiable. It exist outside of history, outside of the record. Inside this bubble the season is unchanging, minute changes to the life of individual plants being absorbed into an invisible and indistinguishable static whole. The sense of the passage of time is diminished. It is not surprising that the legends of some Pygmy tribes reveal a general lack of interest in the past and that their memory of their ancestors is short. Mary Douglas speaks of these indigenous tribes

“going into the forest, using the verb *nyingena*, to enter, as one might speak of entering a hut, or plunging into water, giving the impression that they regard the forest as a separate element.”⁴

It is tempting to think of this image of life in the forest as akin to the nitrogen narcosis induced reverie known as rapture of the deep, in which a diver attempts to merge into the ocean or as Gilles Deleuzes’ notion of haptic space in which there is no clear distinction between up or down, no sense of near or far, no determination of left or right, no understanding of present or past.

Prevailing cognitive models describe the brain as following the forking paths of judgment that experience has established, shifting from one appropriate path to another in response to ever changing sensory feedback. If the brain suspects these paths to be too precarious, too inconstant, too fluid, built, as it were on shifting sand, it wanders unguided by a clear sense of causality or a

response to incoming sensory data. Such a journey is, like the Situationist's *dérive*, spontaneous and misled.

Such wandering and uncertainty might be a sign of madness, but it also reminds us of the discrepant returns of memory found in the work of Alain Robbe-Grillet and of Umberto Eco's inferential walks through a labyrinthine text. Again and again these works propose a world reflected many times over in which the means of negotiating this mirrored labyrinth must be constantly made anew. This is reminiscent of Elias Canetti's note for a novel - a man who always strays and has to find a new way home every night, or of the Damasio's famous "Boswell", a man with a memory that never reached back more than 30 seconds, or of Oliver Sachs' patient who constantly had to reinvent himself in the face of a constantly fleeing memory.

A participant's perception of the environments generated from within the Einstein's Brain Project is manifestly a mental construct. The participant is inside an imaginary world and the location of this world is inside the brain. Flying or floating disembodied through the scenes, the only points of reference are degrees of familiarity, images called up from memories of history or mythology. In a world where everything is, thus, seen as sign or symbol, everything is an index, everything has meaning beyond its visual presence.

The spectacles generated from the physical and visual structure of the brain are a visible representation of invisible, mythic processes. These worlds are not external to the body, but, are properly thought of as being inside the body. This accounts for the apparent invisibility of the body in a virtual space. The body disappears because it is turned in on itself. The ego-boundary is no longer the point at which the body begins and ends in relation to an external environment, but is, rather, like the dimensions of the forest bubble, the very limit of the world.

In these spaces the world is liquid, in constant flux. Paradoxically, although we are presented with a seamless homogenizing, representation it is sustained only by the most fluid of supports, that of memory. All things - histories, identities, images and contexts - are infinitely interchangeable. What you have seen today may or may not be seen or remembered tomorrow. Constantly misled and disoriented, no journey can ever be mentally retraced.

This is fluid history marked by the disappearance of enduring images and objects, rendered ephemeral and insubstantial by the means and sites of their production. Images created here are at the very end of or outside of history. There is only an imagined past and an imaginary future.

The Forest of Vowels is one example of a cranial landscape in which the viewer is able to recognize the possible existence of the self as a microcosm of the external world. In comprehending a world in which individuals are merely phantoms imagining themselves and their reality, the viewer is transfigured, changed in form and condition, a semiotic ghost. While these particular characteristics of matter are yet to be determined, the transformation suggests that the virtual, the illusory is also substantial. Lost in the forest the participant is metamorphosed by the realization that external worlds are constructions of the internal.

Einstein's Brain seeks to establish a space where the participatory subject is submerged in the object. This is not the casual glance at a world passing by a train car window. On the threshold of the Forest of Vowels, the viewer both surveys and is surveyed by the woodlands. The viewer becomes both the object of the gaze and the subject who gazes. As the viewer moves into the forest it transforms itself into a series of maps, which appear simultaneously as neural pathways. Trees become forking paths, projections of bifurcation, suggesting continuous and continual choices. The maps act as transitory, flickering representations of connectivity between discrete sections or locations in the brain. In this landscape there are invisible, incomprehensible connections, as if a fading trail is positioned somewhere between two fading pathways, locating itself in nothingness, lodged within the infinite space between polarities, between worlds.

Virtual Reality - As Real As It Gets

"The very definition of the real had become: that of which it is possible to give an equivalent reproduction... The real is not only what can be reproduced, but that which is already reproduced: that is, the hyperreal...which is entirely in simulation." 5

The project has at its core a series of worlds digitally generated from topographical maps, DFX models of the human body and brain, and neuro-physiological delineations, which are rendered and organized so as to provide familiar yet unnameable, naturalistic environments. Embedded in these spaces are semiotic references to literary, mythological, poetic and social content indicating that an appreciation of this artificial world through effect and appearance is congruent with a representation of the natural world inscribed over and over by mediating and mutating cultural bodies.

The worlds are constructed so as to be in constant flux. Like states rather than objects they are affected by feeder streams of data, by passage through the worlds, and by an elusive and changing perceptual apparatus. Indexes of labour, thoughtlessness and thoughtfulness, sensory deprivation and impairment, and cleverness and stupidity effect dynamic changes throughout the system, altering the body and topography of the worlds.

Active elements, external data sources change the worlds. We are working with a number of statistical agencies to develop a means to mark the changes in the global bio-mass which will in turn affect the worlds. We are linking these continuously changing worlds to various databases, astronomical, social, financial, topographical, medical and these effect the form and content of the spaces. The moon's gravitational forces change the form of the land, the stock exchange is tied to the growth patterns of trees and plants, the daily attendance at Graceland determines the current cultural pattern of the land. Local time elements age the worlds, matching the passage of real time - at night it is night and the only means of navigation is with the aid of (doubly) artificial light. In Spring the worlds are Spring-like, pliant and fecund, in Winter the worlds exhibit brittleness and slow growth. Passage through the world is recorded - a twig breaks when a passerby comes too close, footprints are left in the sand, rocks are worn away by the many steps of many travellers.

Imagine a room - inexhaustibly full of images, sounds, smells and objects. One cannot begin to count all the objects in this room. There are so many, one would not know where to begin or to end. Imagine walking into this room clothed in a thick, insulating suit. Gloves cover the hands, ear plugs make hearing difficult, dark goggles cast the room into a permanent dusk. It is here at the twilight of the senses that the room begins to disappear and the sounds and pressures of the body emerge. Images and sounds seem artificial, lacking full resolution or credibility. Objects seem less solid, sometimes offering little no resistance to a passing body. Depth perception is limited and unconvincing. Remove the suit and the other constraints and the room is restored to full resolution and believability.

We are most aware of the brain when one of its functions is impaired. In absence the function exposes itself and draws attention to the remaining perceptual and communicative operators. A soundless or visionless world is noticeably so. Does the loss, or alteration of a sense make the world any less real? Is the world less real for a blind person, a deaf person, a person with double vision? Was it any less real for Helen Keller? The breakdown of the normal connections in the brain changes the way we construct the world, but, it doesn't, however hallucinatory it may seem, alter our belief that we are in a world.

We think of the body as separate from the world - our skin as the limit of ourselves. This is the ego boundary - the point at which here is not there. Yet, the body is pierced with myriad openings. Each opening admits the world - stardust gathers in our lungs, gases exchange, viruses move through our blood vessels. We are continually linked to the world and other bodies by these strings of matter. We project our bodies into the world - we speak, we breathe, we write, we leave a trail of cells and absorb the trails of others. The body enfolds the world and the world enfolds the body - the notion of the skin as the boundary to the body falls apart. The body, as here not there, and its defining sense of the other is a mental construction - every perception of the other is a creation and every invocation a re-creation.

Inside a virtual space we are almost blind, have little or no sense of touch, our hearing and sense of smell are enfeebled and inconsequential. Our sense of others is abbreviated or entirely absent. We are thrown back upon and into ourselves to sustain our sense of ourselves as being in and of the world. In the most deficient worlds do we lose the sense of ourselves.? The sense that here is not there? That the body begins and ends here? Through its deficient rendering of the world virtual reality allows us to perceive our perceptual apparatus and the representations that construct the world. It suggests that the world is a virtual construction. That the development of consciousness, selfhood, is a function of its capacity to represent the world's contents symbolically in the face of a constantly shifting and exponentially multiplying material world.

We are embracing the simulation technologies as imperfect, reality engines connected not to the generation of a reality but as a means of attending to a consciousness that in turn fashions a reality. The real-time rendering engines provide a space in which the spontaneous processes of being in the world are made evident, generating what neuroscientist Antonio Damasio describes as a "dispositional representation of the self that is in the process of changing as the organism responds to an object." 6 This dynamic representational process occurs in the brain.

"The brain imposes coherence on the external world not the other way around. The external world contributes the reflected light, the raw data, but the brain throws most of that raw data away and does the hard job of computing, piece by piece, the answer to what (is seen)" 7 This is a world made manifest - a world simultaneously apparent and actual.

We are attending to the simulation technologies as diagnostic and analytical tools. The very deficiencies that prove so disruptive to the appreciation of a real-feeling world can provide a means by which content, and form, is made manifest. Virtual reality can act as a filter which renders visible the brain and its processes of the continuous construction of the self. It makes it possible to view ourselves as dynamic entities continually engaged in perpetual iconoclastic biological and social renovation and construction. Given this and other technologies of the self we are now able to undertake transmutational operations that enable us to recognize and transform our image of ourselves.

To this end we are developing worlds in which the raggedness of the virtual reality systems are exaggerated and invoke those dysfunctions of perception associated with brain damage and mental illness. Vision is blurred, detail is shifting and inconstant, slower or faster frame rates suggest a rendering engine behind the scenes, left or right hand sides of stereoscopic vision blink out, depth perception is lost, objects only appear when one is in motion, the edges of the worlds visibly reinvent themselves. In one situation the participant is only able to move through the world by turning to his or her right. Turning to the left freezes and fades the world to invisibility. In another, binocular rivalry, achieved by providing differing inputs to each eye via a stereoscopic HMD, causes parts of the world to be erased, or depending on one's immediately previous attention, to remain. Another uses a slower than normal frame rate to call attention to the motion of a falling object. In yet another, the redrawing of textures lags behind a changing parallax recalls the time light takes to hit the retina and invokes Barthes deliberations on photography in *Camera Lucida*. These are transorganic and hypermorphic world; worlds of smooth, contiguous fields inhabited by the nomadic body, a body, a self - in being, in motion. Antonio Damasio describes the continual, moment-by-moment construction of this self as,

“an evanescent reference state, so continuously and consistently reconstructed that the owner never knows that it is being remade unless something goes wrong with the remaking. Present continuously becomes past, and by the time we take stock of it we are in another present, consumed with planning for the future, which we do on the steppingstones of the past. The present is never here.” 8

As western artists, we developed from a world where we learned to objectify our bodies, to separate our minds from our bodies' viscera, where we learned to distinguish matter from mind and where the construction and placement of objects was the focus and culmination of our intentions and desires. Developments in cultural and social theory and in technology have suggested that we and other artists shift their attention away from a graspable, predominately corporeal world to one which is increasingly slippery, elusive and immaterial. Mind and matter, combining in the cognitive body, are interdependent. The world we inhabit is in flux, comprised of increasingly complex connections and interactions. In this world there are no fixed objects, no unchanging contexts. There are only coexistent, nested multiplicities. Spectator and spectacle are entwined, occupying the same space. Perception enfolds us in matter and synthesizing us and the perceived object. In a world of objects, the subject is characterized and limited by boundaries and frames, perceived very much as invariant and separated from an unbroken field of transformations. Now it is possible to view ourselves as dynamic entities continually engaged in perpetual iconoclastic biological and social renovation and construction. Technologies of the self permit us to undertake transmutational operations on our own bodies and allow us to transform our image of ourselves existing in:

“a state of continuous construction and reconstruction. It is a world where anything goes that can be negotiated. Each reality of self gives way to reflexive questioning, irony and ultimately the playful probing of yet another reality.” 9

Given this can we ever really know our own minds? Living in each other brains as voices, images, words on screen, the brain is merely one image among many, constructing and reconstructing itself even as it makes the world.

1 Sennet, Richard *Flesh and Stone*, Norton, New York, 1994

2 Sennet, Richard *Flesh and Stone*, Norton, New York, 1994

3 As quoted in Thomas F. McDonough's "Situationist Space" published in October 67, MIT Press, Winter 1994

4 Mary Douglas, *The Lele of Kasai in Darryll Forde (ed.), African Worlds: Studies in the Cosmological Worlds and Social Values of African Peoples* (London: Oxford University Press, 1954) as quoted in Yi-Fu Tuan, "Topophilia", Prentice-Hall, New Jersey, 1974.

5 *Simulations* Jean Baudrillard, Semiotexte, New York, 1983

6 Damasio, Antonio R., "Descartes Error", Avon Books, New York, 1994

7 Berwick, Robert C., Los Angeles Times Book Review, "Walking the Walk, Talking the Talk", review of "The Symbolic Species" by Terrence W. Deacon. Sunday, September 7th 1997.

8 Damasio, Antonio R., "Descartes Error", Avon Books, New York, 1994

9 Gergen, Kenneth, "The Saturated Self", as quoted in "Life on the Screen", Sherry Turkle, Simon & Schuster, 1995