The Body Electric

An Exploration of Human Identity in the Digital Age

By Ashen Venema

SONNETS TO ORPHEUS: SECOND PART

x

What over layered time we named is displaced by the machine,
As it assumes possessions rather than obeys the mind,
Ignoring the hesitant gesture of a radiant hand,
It wilfully forges ahead, cutting sharp into the stone.

Nor does it ever slow down enough for us to win distance,
Or remain oiled by itself in the silent halls of fact.
It circles in living and claims to know best about living.
It so orders, creates and destroys indifferent to all.

Yet our being remains spun in mysteries of birthing
Origins from enchanted wells, a play of pristine powers
To behold only with eyes closed and in adoration.

Words still softly dissolve before the unspeakable state,
While the most resonant stones give form to ever new sounds,
And gather music into the unmade.

Rainer Maria Rilke
translated by Ashen Venema

THE BODY ELECTRIC

An Exploration of Human Identity in the Digital Age

Man is only a recent invention, a figure not yet two centuries old, a new wrinkle in our knowledge; he will disappear again as soon as that knowledge has discovered a new form.

Michael Foucault (1)

Visionary statements, like Foucault's, which force a wider perspective on reality, are common practice among cultural theorists in the post-modern age. Yet fifty years ago, Maya Deren, an artist who produced a few very influential short films during her short life, already resonated with this post-modern spirit: 'Why would one exalt the integrity of nature or any part of it, in its own terms, or seek to fashion an art form out of its intrinsic values and inalienable logics, when our age has arrived at the ultimate relationships in the discovery that all matter is energy? To create a form of life is, in the final analysis, much more demanding than to render one which is ready-made.' (2). Picasso's view of nature's illusory forms resonates: 'Art is a lie that makes us realise the truth...' (3) For Maya Deren, scientific findings were but the raw materials of ultimate creative action: 'The first step of creative action is the violation of the natural integrity of an original context.' (4) She saw the function of art and its validation, in the creation of mythical reality.

In this last decade of the twentieth century, the very concept of an 'original' has to surrender its meaning, and each of us is called upon to create mythical reality. Maya Deren would have adjusted well to the digital revolution that fragments all assumptions and values we hold about human nature and reality. As yet most people are still mystified by all the fuss and find it difficult to comprehend what the shift from analogue to digital processes implies. In the meantime we are all influenced by the breakdown of the linear metaphor and are already experiencing the impact it has on how we relate to the world and ourselves.

A digit is weightless, has no location and exists only in a sort of electric abeyance, a quantum dance, until it is temporarily assigned to a context. What it 'becomes' depends on its combination and interaction with other digits that contain encoded data (bits made up of binary numbers). The oracular quality of a digital system offers infinite combinations of data. It masters instant collations in the way our dreaming brain draws together random themes. Almost independent of space and time, the digital differs radically from the analogue process, which can only communicate information that is similar to its original organic source. A digital system has no such continuity, but can replicate itself endlessly without deterioration, and, given sufficient data, potentially simulate everything that is known. Its signals are compressed and transferred in no time through copper-cables, fibre-optics or radio around the globe and further, where at the port of arrival, the information is decoded and expanded

again. Thus, through the computer, through the media, we are wired up in a parallel interactive universe where our collective mind appears before us, or in Michael Benedict's words, 'Cyberspace, a tablet become a page, become a screen, become a world, a virtual world. Everywhere and nowhere, a place where nothing is forgotten, and yet everything changes.' (5)

My own fascination with the digital metaphor is tempered by concerns about some of the ways in which such new technologies are applied. Exploring that conflict will therefore form part of this exploration of identity in the digital age and influence my philosophical translation.

I had planned to structure this discussion with a conceptual triad of spaces, roughly relating to the worlds of cosmos, psyche and pneuma. Others have adopted such methodology by using different terms, Henry Lefebvre, Karl Popper and Roger Penrose amongst them (6). The wealth of information I encountered made it impractical to impose such a structure. Instead I opted for a method of intuitive assembly, which in a sense reflects the complexity of current debates.

THE VANISHING TIME

Once stored, all memories of a digital system are instantly accessible for re-shuffle. It was the dream of Wilhelm Leibnitz (1645-1716), to develop an electric language, a universal calculus that would compile all human culture into a single shared database. (7) He might, or might not, have foreseen the ecstasy of an interactive 'virtual reality' experience, like that of Henry Michaux:

...we would enter the world of fluids ... Over with the solid, over with the continuous and the calm; some dance quality would invade everything and Cartesian philosophers would go through a trance, floating on history like chops on gravy. (8)

'Death to the particle, long live the wave', might be the slogan, resonating with an earlier one from the 60s, 'All you need is love'. Ironically it was the USA Department of Defence, which through decentralising its computer data system for security reasons, created the blueprint for the 'web' as we know it today. The early computer rebels were inspired by the psychedelic experience of the 1960s, celebrating a shift of values away from fixed principles towards a process of fluid becoming. Michaux sums up the extremes of a particle/wave dichotomy. Between the conflicting desires for self-formation (putting together), and self-release (taking apart), virtual battles are fought, battles over new human forms and values.

The non-linear feedback loops of digital systems have accelerated the discoveries of new 'scientific raw materials' through the rapid dissemination of ideas, and spread with equal speed the interpretations and potential implications of every discovery to the public. With everything linked to everything, all information comes quickly full circle. With instant in-form-ation nothing maintains its form for long enough to take root. Time has quickened, space is disappearing and old names become meaningless. The result is a new philosophy of

redundancy: a redundancy of time, the original, nature, the body, history and human identity as we know it, summed up in a frequently used quote by William Burroughs: 'The entire planet is being developed into terminal identity and complete surrender.' (9)

THE VANISHING SPACE

Let us wage a war on totality; let us be witness to the unpresentable; let us activate the differences and save the honour of the name.

Jean Francois Lyotard (10)

Lyotard encapsulates the postmodern spirit that attacks the nostalgia for the stable and the whole. Reactions to a quickening of change often expresses itself in extremes, either by a desire to return to the womb, the impulse to go unconscious when life seems too complex to deal with, or by a rejection of the womb in the style of Icarus's winged flight towards the light of the sun.

Thirty years ago mankind took the safer option with a flight to the moon. Our sight was lifted to perceive not only a global perspective, but also a collective 'instant' sharing of a new self-image. We participated in the astronaut's gathering of rock and moon dust, but what struck us was his view of the earth. From down there, or up there, 'we' appeared whole, silent, finite, beautiful and vulnerable. Reflecting today on this historical instance of global consciousness, it still evokes wonder but also helplessness, a beginning trend of a collective disembodiment, of a culture retreating into virtual space. Ongoing questions of accountability, urged by the increase of 'global participation' in our living-rooms, became too complex to solve for nations, let alone individuals. Watching ourselves watching abuse, starving children, napalm victims or electronic warfare from comfortable armchairs, confronts us with our human inadequacies.

Virtual space poses a paradox in that it provides emotional distance, while it speeds up the consequences of our actions and brings them into sharp relief. With a Cold War policy having become untenable and no aliens from outer space in sight, our enemies crowd at our doorstep and take shape inside … physically, through waste and poisonous by-products of consumer goods, in the form of mutant cells and freak bacteria that upset the principles of homeostasis in the soil, rivers, plants, livestock and our bodies, and psychologically, through the breakdown of social structures and values, resulting in stress-symptoms and depression.

With more and more people caught up in conflict, crime is on the increase, and through various over-definitions, like the Public Order Act, has achieved a vocational status, which inspires novel and sophisticated surveillance devices. Progress and technical advances are often directly related to the outwitting of some 'enemy' and to benefit society, and while considered good, are charged with ambivalence. Surveillance devices, for example, have made it possible to reveal the secrets of our most intimate moments. On the whole, this trend is not only tolerated by our society, it has changed the meaning of voyeurism, given the number of successful TV programmes like Candid Camera, I Spy, Surveillance, Crime-Watch, and the ones of personal confessions and traumas, including the process of dying.

Spaces to hide from the other, or resist the other, are vanishing as more and more remaining secrets of our human nature are floodlit. The media's unmasking operation of reality de-contextualises all events into so many relative viewpoints that we lose sight of a meaningful geography to take position in. Events do not seem to happen in physical spaces any more, and our little voice is lost in a cacophony of voices that merge into white noise. Baudrillard sees the forced silence of the masses as: '… no longer a sign of passivity and alienation, its vision no longer optimistic or pessimistic, but ironic and antagonistic.' (11). He also suggests the strategic resistance of the masses being that of:

... refusal of meaning and the refusal of speech; or of the hyper conformist simulation of the very mechanism of the system, which is another form of refusal by over acceptance. It is the actual strategy of the masses ... it is the winning one today, because it is the most adapted to the present phase of the system. (12)

This simulated reality blinds us with a Gestalt of our collective mind. It is a world where everything, every viewpoint exists at the same time. It lacks context and shadow definition, over-exposes our field of consciousness. It seems to announce the prospect of Baudrillard's schizophrenic subject, someone who '... can no longer produce the limits of his own being, can no longer produce himself as a mirror ... only a pure screen, a switching centre for all the networks of influence. (13)

What happens at the switching centre would seem to be of vital importance. Donna Donna Haraway, a Professor of the History of Consciousness, sees pleasure in the confusion or boundaries and in the responsibility of their construction: '...building and destroying...both are bound in a spiral dance. I would rather be a cyborg than a goddess.' (14) Her point is that technology is not neutral: '...we're inside of what we make and it's inside of us. We're living in a world of connections and it matters which ones get made and unmade.' (15)

The important question is who makes and unmakes connection in the public domain, the media? Presently they are scientists and theorists like Haraway and Baudrillard, stars, politicians, filmmakers, pop-culture gurus and the determining agents we sanction to express our wants and desires, culminating in the consumer industry with its advertisements. To gain influence through this virtual network requires access, a media position or the awareness of a political context, a will to sell one's personality with a voice amplified in virtual space, the space where reality seems to be negotiated and decided. In a world that reveals itself as a self-conscious organism, where the proverbial butterfly wing is seen to make an impact, each member is accountable. We should indeed be wary of the seduction, of merely becoming a switching centre, a simulation of the system, be it for the consensual hallucinations of a 'New Jerusalem', or the 'Sprawl' of Gibsons's Neuromancer, (16) where micro bionics are the tools of warfare, or any virtual experiment. Few are as yet in a position to interact in this spiral dance and re-design boundaries from a history freed into bits. Observing the phenomena of electric space, with the simulacra of our nervous system turned inside out, we can no longer pretend that our perceptions and thoughts have no impact on our embodied reality.

The seduction that concerns and fascinates Baudrillard and others applies as long as we confuse the electric network connections for inner connections. By inner, I do not mean

the system of neurons that make up our brain, of which the electric web is a simulacrum, but the reality of our psychological experience from where our images of mythical reality motivate all our activities, where shadows come to be and have to be reckoned with.

THE VANISHING BODY

As soon as what is unconcealed no longer concerns man even as object, but does so, rather, exclusively as standing-reserve, and man in the midst of objectlessness is nothing but the orderer of the standing-reserve, then he comes to the very brink of a precipitous fall; that is, he comes to the point where he himself will have to be taken as standing- reserve. Meanwhile man, precisely as the one so threatened, exalts himself to the posture of lord of the earth.

Martin Heidegger (17)

We have given our technologies our feet to walk, our eyes to see, our brains to calculate, our hearts to beat; we are in danger of identifying with our sensory extensions so completely that we give them our will to act as well. If the perception of individuals is not guided towards inner connections, the harnessing of our imagination and thoughts, the collective shadow entities of our neglected psyche may act on hidden agendas without the consent of our informed, embodied heart.

Physical bodies have needs that are instigated but not fulfilled in the virtual world. Since one computer can now do the work of hundreds of brains, millions of citizens are deprived of their personal need for meaningful occupation and relationship. Collectively, our daily lives are full of events instigated by machines. Computers now calculate and monitor our financial records with institutions, interpret data to determine consumer trends and political decisions, including social and educational policies, but most of all economic trends. Speed is survival, without profit and quick turnover no business can stay in the race. The digital success carries its calculating genius into all areas of our lives. We are either hooked up to or are competing with electronic machines. The status of human nature, gender and identity is questioned, examined and exposed, right down to our cells. The human body/mind being, rapidly taken apart and fed into gene and data-banks, has already become a standing-reserve, a mere reservoir of useful data.

In a recent TV slot with the title ‘Black Holes in Science,’ a geneticist commented on a spectacular scientific breakthrough: Dolly’s genes, he said, were taken from a sheep seven years down the line of development. If Dolly grows old we have to ask: why are babies born young, and what’s the point of males? Just as remarkable is the unsettling speed by which this theme travels the globe. The initial information about Dolly’s cloning success had the effect that within forty-eight hours of the announcement the share-price of the patent for adult cloning had climbed to £40 million. (18)

Baudrillard talks of the ‘ecstasy’ of communication. (19) For the corporation who owns a cloning patent, this ecstasy is energy released from time and seduces with power. Unlike most of us, a corporation has the resources and the knowhow to make use of such

information, while ordinary people are subject to the consequences of potential applications by, let's say, gene raiders. This scenario was still science myth in 1968 when Philip Dick wrote his story about androids, on which Ridley Scott based his film 'Blade Runner' in 1982.

An atomistic science that took pride in banishing myth has unwittingly led to the resurrection of eternal human myths in cyberspace and on cinema screens. Anxieties about human identity are often expressed in science fiction, which acquired cult status in projecting mythical realities. I will use a few facets from the film 'Blade Runner' as a thread to connect the kite of our imaginary projection to the hand that would hold it.

A smoke-spitting LA set in the twenty first century. Solemn music, a towering monument, a microchip turned Egyptian pyramid, the head-quarters of Tyrell's biotech corporation. Docile middle classes feed the pleasure driven economy. From floating crafts loop seductive messages of 'golden opportunities' on off-world colonies. Blue smoke thickens over the dystopian scene of poverty, a multi-lingual crowd in a matrix of shady dealings and ingenuity, fertile ground for geniuses like Sebastian, the genetic engineer working for the Tyrell Corporation. He has not passed the required health test for access to upper levels and works alone in a deserted building. He 'constructs' friends and designs the nervous system of Nexus 6, Tyrell's replicant model of optimum self-sufficiency which are undistinguishable from humans. They recently escaped their off-world labour assignment, killed a human shuttle crew and two of their own – to do what? This troubles Tyrell. The remaining four replicants have been sighted in LA and are, as a matter of urgency, on the hit-list to be retired.

In this now familiar split dystopian world the evil force is the corporation. Annette Kuhn points to this theme in a textual analysis of science fiction: 'The science fiction genres' long-standing preoccupation with narratives involving masculine mastery over nature and creation currently manifests itself in stories involving the 'birthing' of human substitutes by corporations rather than by the Frankenstein, mad scientist villains of earlier films.' (20)

Our genetic science attracts huge financial backings, and since the early 90s, cognitive science, with its research into artificial intelligence (AI), is equally generously funded. Our climate of a materialist philosophy envisions the zero point, where birth and death meet, which proposes that given enough data, everything in nature can not only be simulated but also replicated. The human being, or at least what we understand by human, is squeezed into the micro-chip like the genie into the bottle. Aims are not defined, but as J. F. Lyotard argues in 1984, in the discourse of today's research the only credible goal is power.' (21)

Scientists, with exceptions, tend to be pragmatic. The intense discipline of scientific study, which specialises in the isolation of building blocks, the raw material of mythical reality, leaves little time for either contemplating financial gains, or the psychological and social implications of fresh discoveries. Metaphors which bridge and relate new findings in one field to those in other fields of knowledge usually derive from philosophers, artists and the general public's imagination, and are sometimes defensively downgraded by scientists.

The late Gregory Bateson was exceptional. In 'Steps to an Ecology of the Mind,' he argues that where scientific purpose determines what will come under the inspection of

consciousness, an awareness of the context is lost, which he describes as a cybernetically organised self-corrective system and its internal dependencies. (22) Since Bateson's speech in 1968, this determining process has gained such speed that it lost sight of moral or ethical considerations. Bateson took wisdom to be the knowledge of the larger interactive system. He cannot now join the present discussions or comment on some of the recent, astonishing remarks by scientists who practise exclusively the narrow, deterministic approach, like Francis Crick, Noble Laureate for the co-discovery of DNA:

You are, in fact, no more than the behaviour of a vast assembly of nerve-cells – as Lewis Carroll's Alice might have phrased it – you are nothing but a pack of neurons. (23)

True, our neurological system is conditioned by repetitive impressions over time, and in turn, our behaviour is based on predictable mechanical modes. On the other hand, it is safe to assume that, if there was nothing more to us, our existence would have no meaning; we would simply not be here.

Crick laments that seventy per cent of Americans still believe in angels; so would Daniel C. Dennett, since he holds consciousness to be an illusion and brains to be virtual machines (24). Such notions have encouraged fantasies of transmitting (downloading) the contents of one brain to another.

In the world of AI, scientists have no need for the concept of a soul, apart from maybe the mathematician Edmund Furse, who, while also a reductionist, differs from Dennett in that he is Catholic and therefore argues that future robots will pray to God. (25) Donna Haraway has a more mythical approach: 'A cyborg body is not innocent; it was not born in a garden; it does not seek unitary identity and so generates antagonistic dualities without end, or until the world ends, it takes irony for granted.' (26)

THE SYMBOL GROUNDING PROBLEM

Some artificial life (AL) gurus, have a notion that consciousness will emerge from bottom up designed machines, and are expressing the visions of a post-human era, among them Kevin Kelly:

...as we unleash living forces into our created machines, we lose control of them. They acquire wildness and some of the surprises that the wild entails. This then is the dilemma all gods must accept: That they can no longer be completely sovereign over their finest creations. (27)

In 'Blade Runner' the replicants are indistinguishable from humans and so well designed that over time they will develop emotional responses. Tyrell says: 'If we give them a past, we create a cushion for their emotions and can control them.' He has equipped them with a 'fail safe device' that restricts their lifespan to four years. Their escape causes grave danger to their maker. Leon, one of the Nexus, is caught and subjected to a standard test. His retina is monitored through a micro lens device while he is being bombarded with a series of questions in order to evoke an emotional

response. In a gripping scene Leon flips at the mention of the word 'mother'. He blasts away his interrogator. 'Mother' is equivalent to history. Leon has no mother, or history, and no amount of photographs from his presumed childhood make up for it. With time running out, the future for Leon and the other replicants hinges on finding their maker, to gain knowledge of their making.

To be 'tested' feels familiar to us, as does the desire to prolong our 'fail safe device'. Our corporations would not pour huge financial resources into fields that research our making if there was no market for it. We have become functional in a society based on efficiency and testing that promises a longer and better quality of life. In 'Blade Runner' the tester sees Leon as a bundle of cells, wires, chips and neurons, a bundle that can be replaced and has only functional value. With our testing in schools, children are already seen as functional units with a curriculum in the service of economic success and progress. There is concern by teachers that testing overrides context, the local situation and the personal qualities and talents of a young person. It seems that we test ourselves against computers and machines for efficiency and usefulness, measured against an aesthetic of the ready-made, pre-cooked, pre-thought, pre-solved and pre-formed. The fascination is with structure, rather than bringing forth new creations from beneath the scaffolding. Horst Hendriks-Jansen makes a case for cognition arising from a personal history of situated embodied experience. In 'Catching Ourselves in the Act' he quotes Fischer and Bidell's view that today's research questions are posed in a yes-or-no fashion that pre-supposes the meaning of the studied behaviours. (28)

In the scientific discussions on AI and AL, broadly differentiated as top down (strong) and bottom up (weak) materialists, dualists and idealists now pitch their will towards victory in determining the relationship between mind and brain. The post-human vision by Kevin Kelly, of machines superseding us, is based on the bottom up AL approach, the emergent, the system, the probability, the associative, the trial and error … lots of little robots learning from lots of mistakes - the biological approach.

By comparison, most information processing computers are based on the top down AI approach, which is a rule driven, logical, algorithmic approach, aiming to explain and eventually predict all formal principles of life, and given enough data, to simulate, if not replicate, body, mind and consciousness; in other words, reducing consciousness to a mechanical process, a by-product of matter. It cannot therefore be seen to act on the brain for that would be a causal paradox. Quotes by Crick and Dennett are based on this material, deterministic approach.

John Searle, a Professor of Philosophy from the University of California, opposes the assumptions of this latter approach that intelligence is just a matter of physical symbol manipulation. He calls AI a fake science, and argues that the symbols in a formal system have no meaning, no semantic content, only syntax. Searle designed the 'Chinese Room' thought experience to powerfully prove his point. It proposes a programme that has been written to simulate the understanding of Chinese. The computer will match questions against its memory (data base) and produce appropriate answers to the questions in Chinese, but has absolutely no interpretation or meaning attached to the purely formal syntactic symbol. (29) Searle's argument, dramatised and put to film, is so convincing, that it makes the information

processing computer less of a threat to the autonomy of our minds.

The Web bristles with debates that aim to refute Searle. Stevan Harnad argues that the 'Blind Watchmaker' makes no difference between the conscious ones and zombies, because the two are functionally equivalent and functionally indistinguishable, and survival and production are purely formal matters. (30). He does, however, concede that consciousness eludes a scientific theory. At present it seems economically more viable to regard consciousness as an epiphenomenon of the brain, as the logically convincing argument. Marvin Minsky, good at looping arguments, asks: 'What makes everyone so sure that they are conscious? The evidence that we are self-aware is very weak indeed.' (31) He has, of course, a point. Searle's emphasis on subjective mental phenomena as basis for our behaviour keeps being regarded as unscientific by cognitive science as a useless inquiry because it cannot be controlled.

Cognitive science has a new hope in connectionism, which looks at how systems can learn by recognising patterns. Connectionism does, however, lack the connection to symbols. Harnad asks: 'How is symbolic meaning to be grounded in something other than just more meaningless symbols?' (32) This lack is now called 'The Symbol Grounding Problem'.

The 'Oxford Dictionary' defines 'symbol' rather poorly as a thing embodying certain characteristics. As such, however, it only acquires meaning in the experience of people in a particular situation, and even then only when the surface code is broken to reveal deeper understanding. This process happens in the imagination and has nothing whatsoever to do with rational evidence. A symbol is 'grounded' only in personal experience, and rather like a musical note must be deciphered again and again, without ever being fully explained.

The hard problem for the logic-minded is the fluid nature of the imagination. David Chalmers, a mathematician who switched to consciousness studies, argues the case. He uses the term 'hard problem' to point at the paradox in describing consciousness as a material object without taking account of our 'inner' personal experience. (33)

The mythic reality of a 'Blade Runner' scenario highlights this Cinderella element in AI research, the relevance of our inner experience from which evolves meaning and purpose. We are dream-makers, it is therefore irrelevant whether scientific claims are actually realisable; the fact that we can think about the possibility of adult cloning or intelligent machines is enough to evoke 'Blade Runner' style replicants in our collective imagination as a mythical reality. The way we make sense of embodied reality profoundly affects it. We are dreamers and reality-makers as well as the product of our dreams. Horst Hendriks-Jansen remarks that intricate structures continually emerge in nature (including our thoughts) without the need for an explicit plan. (34) Yet there persists a belief that structure precedes thought and action.

Since the rigour of scientific inquiry brought us the conscious appreciation of our potential, together with industry and power over nature, it carries the weight of conviction towards determining control and continued progress. Giving our instruments an almost transpersonal significance seems like an irony of reason. On a personal level, many would admit to feeling diminished without their car, telephone, TV or computer. Some would not

live without artificial organs, or have a poor quality of life without artificial limbs or sensory devices. The materialist approach has enabled great inventions and a greater understanding about ourselves, the problem occurs when scientists interpret new understandings from the same narrow perspective that is required for their discipline. From a wider angle, spanning the last three hundred years, it can be seen that we have separated out parts of our human nature, which are now acting in our instruments. These parts have become visible to us, in mechanical repetitions, electronic calculations, and now in the digital processes that simulate our mind.

The advent of the 'individual' during the industrial phase coincided with the 'getting a handle' on behaviour. Machines at first were transparent, could be taken apart, to reveal the structure of their repetitive workings. Parallel with the understanding of mechanics came the theories of behaviourism, a useful map for the mechanism of human behaviour, which was narrowly applied in the control of the masses and the individual. Enforced repetitive discipline made good citizens and fast workers on the production-line. Gradually machines out-performed, not only our mechanical, but also our sensory skills. Marshall McLuhan observed in the 60s:

Communication-Networks = an extension of our nervous system, like the wheel is an extension of the foot, the telescope an extension of our eye. Now the TV becomes our ears and mouths. We have breached the termination barrier of the skin. (35)

Technological devices were able to see through, see further, hear sounds inaudible to our ears, and communicate our images and thoughts instantly, they became better, faster, more reliable, intelligent and opaque. This is why a computer like IBM's 'Deep Blue' can become a personified opponent to our most capable chess-players. The current model of Deep Blue can think seventy-four moves ahead, compared to the ten of a typical chess master; it recently beat Gary Kasparov, proving, according to headlines, a giant step for computerkind. Deep Blue is able to scan 300 000 positions per second and can be improved; where does that leave our Kasparov's? Developed within the context of our war fares, our technologies consistently had the initial aim of anticipating the 'other's' move.

By now we have virtual wars, and a global deterrence strategy that renders the spatial frequency of matter dead.'

Paul Virilio (36)

More than the skin barrier is breached when machines are perceived as intelligent and opaque, and the human being as transparent and redundant. What specific quality remains to identify ourselves as human beings?

The question: 'Can machines be intelligent?' is shifting to: 'Can machines be alive?' Sherry Turkle has done detailed ethnographical and clinical research on the impact of computer culture. She observes that during the 1980s, when children started growing up with computers, the criteria for the child whether something was alive or not was no more 'movement,' either physical or mechanical, instead the criteria for aliveness became psychological. Computer toys with human-like qualities assumed identity and became

intimate. People were now special because they could feel, unlike computers. After several decades of asking, ‘What does it mean to think?’ the question at the end of the twentieth century is, ‘What does it mean to be alive?’ (37) Can an artefact have feelings and be alive?

THE EYES THAT WOULD FIX AND CONTROL US AS OBJECTS

The ‘Blade Runner’ is not considered to kill life, but to ‘retire’ replicants. The definition of life, based on mother/history, comes to trouble our protagonist Decker, the former Blade Runner who is ordered to do the ‘skin jobs.’ Leon, after killing his interrogator, is on the run. He finds Decker and is ready to push his eyes into their socket when he is shot by another, fifth (new generation) replicant. She is Rachel, the private secretary to Tyrell who suspects her own replicancy after Decker has done a demo test on her. ‘How can she not know what she is?’ Decker is thrown into confusion by the fuzzy boundaries of this new replicant model that has been made to believe she is human. Rachel is now tortured by doubt in her identity and by her love for Decker. She, too, is on the run. After saving Decker’s life, they become lovers. The remaining replicants, Roy and his woman, Pris, are hiding out with Sebastian and his mechanical friends. Roy manages to persuade Sebastian to lead him to Tyrell with the ruse of a passion for chess Sebastian shares with his boss. Confronting Tyrell, Roy ponders: ‘It’s not easy to meet your maker.’ When Tyrell can’t reverse the ‘fail safe device’, Roy pushes Tyrell’s eyes into their sockets, retires his maker.

Here are our hopes and fears, and the urge to destroy eyes that would fix and control history, limit personal meaning and mirror the individual as separate object. Replicants are given human sentiments, which suggest there may be no intrinsic value to human nature, that it is in the context of our relationships that we become human. In the replicant we see the human dilemma of being deprived of coordinates. We see the parts we have separated out, and which now seem to make us redundant, the mechanical, electronic and simulating aspects of human nature. ‘Blade Runner’ is a creative attempt to evaluate our present status.

Like us, replicants chase for the evidence of their existence, like us, they are obsessed with their origins and in particular with the photographs of their fabricated past. Decker hurts Rachel by telling her that the memories she thinks she has are implants, memories from Tyrell’s niece; but in the face of Rachel's pain, Decker begins to doubt his own status – he, too, could be a replicant. He samples his family photographic snapshots for assurance.

Without the concept of a divine creating principle, it becomes difficult to fully accept the illusory, fragile nature of our identity; we are challenged to individually shoulder the burden of existential insecurity. Memories are based not so much on facts, but on our interpretations of events; they are rather like representations of a mythical reality, dreamlike, kaleidoscopic; they don’t prove anything in the ordinary sense. The war of words over the ‘false memory syndrome’ points to representations of personal meaningful myth/memory rather than facts. A great book on photography and surrealism, ‘L’Amour Fou,’ carries a quote by Roger Callois which can serve as an analogy to highlight the problem:

It is with represented space that the drama becomes clear: for the living being, the organism, is no longer the origin of the coordinates, but is one point among others; it is dispossessed of its privilege and, in the strongest sense of the term, no longer knows where to put itself. (38)

Place, context and relationships, are vital to the experience of identity; our attachments provide the stability for a self-identification process, a safe zone against the chaos of too many viewpoints, it gives us a personal sense as to what is real and what is meaningful to us – this identity. One could see it as an energy-field that grows in relation to the reality one can create for oneself, or shrinks when that reality is losing its coordinates and is therefore threatened.

Losing our objects of identification, in the parlance of 'object relationships,' is to have them invalidated and deprived of their meaning and reality. This influential psychological model does, however, also hide a language of separation which, if seen in bad faith, works against genuine intimate relationships. The physicist Danah Zohar points out that both machines and people share the quality of being *objects*. 'All live in the shadow of Descartes's isolated cogito and Newton's impenetrable billiard balls and the work of each is in its own way, an inevitable development from those prototypes of detachment, and contributes in no small measure to the sense of alienation felt by so many.' (39)

Our ideas about identity have been coloured and fixed by classical physics and its language of separation, bearing a connection to the extremes of our utopian and dystopian myths. In the way that digital technology confronts us with the illusionary aspect of our transient existence, it models a process of identification as composed of impressions we have synthesised over time and simulated into that personality, that nation, that world; it suggests we are the artists of our continuous self-inventions. Implications of such freedom can be terrifying to the individual, and being classified as a functional object, isolated from other objects, can only increase existential fears. The creative post-modern response expresses itself as aesthetic pleasure in the destruction of old forms.

SEEING THROUGH SIMULACRA

'... technology, instead of liberating us from myth, confronts as a force of a second nature just as overwhelming as the forces of a more elementary nature in archaic times.

Walter Benjamin (40)

When our living experience begins to look like a dissected corpse, it is not surprising that there should be a delight in the spiral dance of building and destroying, which Donna Haraway speaks about. The psychological distance we achieved, first through photography, then film and now through the virtual representations of ourselves, brings the themes of our myths into conscious sight, in the way that Walter Benjamin already in his time speaks about the camera introducing us to unconscious optics, as psychoanalysis does to unconscious

impulses. (41) All our prominent mythical themes are now placed into cyberspace, interpreted and illuminated as personal mythical realities. Approached playfully, the virtual becomes an experimental therapeutic space for artificially-constructed spaces, personalities, and electric designer bodies. The world's first virtual popstar has recently arrived on a Japanese Website; her name is Kyoko Date, and she is described by Pat Kane (*Guardian, Jan*. 17. 96) as teenage Frankenstein's angel made from reasonable anonymous human parts. Maybe Reverend Don Cupitt's statement applies to such simulated personae:

We have to learn to accept our own temporality, our own mortality, our finitude. The days are gone when we believed in the soul and free will, or that the inner life is of supreme importance. The soul, the self, has died. The self is an animal with cultural inscriptions on the surface. (42)

While Don Cupitt's comment sounds curiously moralistic, Baudrillard in a similar vein observes with irony: 'The body is now an infinite set of surfaces, a fractal subject, an object among objects … Neurophysiology replaces the Freudian model of the soul (psyche) with an informational code of billions of neurons.' (43) If we replace neurons with digits, what is the difference between our personality and that of Kyoko Date? On the surface, her intimate resemblance lies in her simulated body, her simulated intelligence and her simulated personality, which is based on human psychology and gives the impression of consciousness. Japan has also introduced a dating agency, offering modern virtual Geishas. These personae are not unpredictable like complex human beings, have no ulterior motives and project no ambivalent feelings; instead they relate formally, according to expectation. There is a trend for clean cognitive relationships without the messy encounter of human frailty. In the USA there are now programmes available, like Depression 2.0 (released in 1992), that will treat your intimate details with methodical reliability and will teach you a positive, progressive outlook on life. (43) Cautious criticism about depression 2.0 was countered by the programme designers: 'After all, the computer doesn't burn out, look down on you or try to have sex with you.' (44) Beyond the surface, these virtual personae's have no inner state, are assembled parts of a digital matrix, data, kept in ready abeyance by electric energy. In this context it is possible to invest ones psychology and stay in control. Here, as Walt Whitman saw it, depression ceases to be the royal road to the soul.

In another scenario, real people simulate personalities of their choice and have relationships with other people in cyberspace. On the web we convince by embodying ourselves in another person's mind, like Julie, a severely disabled older woman. She could operate her computer with a head appliance and became a very successful agony aunt on the Worldwide Web during 1985. Her advice and insights transformed peoples' lives. She made many women friends whom she never physically met. Yet Julie was a fiction.

After several years she was tracked down by one of her devoted admirers, and turned out to be a middle-aged male psychiatrist. He had initially connected to the website by accident; the easy intimacy of sharing between women came as a revelation to him, and wanting a part in it, he developed the character of Julia. Reactions to the gender bluff varied from humorous acceptance to rage. 'I felt trapped,' one woman said, 'I felt my deepest secrets had been violated.' (45)

This woman felt so deeply betrayed by the deception that she needed to invalidate her otherwise genuine experience. It is part of the attraction of the Web that in virtual reality we can simulate who we want to be, or who we think we are, on the basis that this is not having any real consequence. Yet psychologically, just as in physical relationships, we face our personal limitation. Any relationship we engage in, virtual or not, will reveal ourselves to our own eyes. In the case of Julia there remains the element of human frailty, but in the exchange with a virtual persona the human projection is neither absorbed nor changed, it bounces back cool as from a crystal mirror. Some people who have been abused and manipulated, and lost trust in relationships, may find reprieve in such cool reflection and even gain some new self-respect. We have to wait for further studies in this field in order to evaluate how relationships with electronic personae can replace our need for positive attention.

In the end there is no such thing as the replication of a presence, the meeting of another pair of eyes in the features of a human face. A vital loss occurs when 'to be seen' no longer happens through eyes as mirrors of the soul, eyes that give us existence, but through eyes as 'mirrors of mirrors' that record without meaning, eyes that cannot rest, sleep or dream, mechanical eyes that will forget nothing, redeem nothing, know no mercy. We are lost to a sightless vision, which is what Paul Virilio might mean with 'the tracking down of darkness,' a vision of 'intense blindness.' (46)

This sightless vision ignores our vital need for redemption, a resonance with something greater than our little story. The problem seeks a solution in 'Blade Runner,' where the logical extension for 'life's desire for life' to have meaning rests with giving 'new meaning' to the greatest threat, the spiritual autonomy of the replicant.

Retiring Pris is hard work. Since Decker's perception of replicants is changing, his actions lose meaning and with it his energy weakens. When Roy finds his partner sprawled on the floor, he howls like a wild animal and gives chase to Decker, mocks him: 'It's quite an experience to live in fear, isn't it? That's what it is like to be a slave.' When Roy catches up, Decker hangs precariously from the rooftop. What follows are moments of intimacy only the vicinity of death can bring about. In a curious reversal the replicant is endowed with poetic sensibility and the ultimate yearning for life's continuity, a yearning big enough to save Decker's life before his own time is up. The replicant, the created 'double' becomes the redeemer.

Here the replicant models to the human - become machine - how to be human again. If we and our replications were not able to 'die,' the future would be ruled by our most pervasive unconscious projection, the all-seeing punishing master, an unforgiving superego surveyor, too terrible to contemplate

There was a child went forth every day, and the first object he looked upon, that object he became.

Walt Whitman

In the spirit of Whitman's reflections on a child, I want to know what we are becoming, Sherry Turkle asks if the first objects we look upon each day are simulations into which we

deploy our virtual selves. (47) She relates her experience with Rodney Brook's artificial two-year-old creature 'Cog'. Cog is an attempt to embody emergent intelligence, based on the assumption that what we see as complex behaviours is actually simple responses to a complex environment. Sherry was extremely sceptical: 'Cog noticed me soon after I entered its room. Its head turned to follow me and I was embarrassed how this made me happy. I found myself competing with another visitor for its attention. At one point I felt sure that Cog's eyes had caught my own. My visit left me shaken - not by anything that Cog was able to accomplish but by my own reactions to 'him'. (48) Sherry believes that our experiments with virtual reality and artificial life are serious play, that our need for a practical philosophy of self-knowledge has never been greater.

The peril of escape from disillusionments with embodied reality, the flying off with the kite, divorced from the connection to body and ground, has had sinister consequences, as our stories tell, which is why materialist scientists sit so comfortably with their devaluation of subjective experience, the complex assembly of instincts, archetypal images, myth, symbols - the psyche – the virtual space of the feminine principle. The masculine encryptors, as Henri Lefebvre puts it, brutally and aggressively mistreat space as a feminised body. 'Over abstract space reign phallic solitude and the self-destruction of desire...the body is pulverised.' (49) We have been described in mechanical terms as machine, in computer terms as hardware and software, presently as bundles of neurons, genes, bits and so on, leading up to the comparison with the electric, the virtual. Having caught up with raw materials, it is now our spirit that animates and embodies our world.

In this chaotic, liminal phase we are not aided by the polarisation of: outer/inner, male/female, atom/wave, up/down, any longer. Sherry's 'as if' experience with Cog, for example, happens in the imagination, is participatory and animates. John Wheeler talks of the vital act of participation, where the new concept of quantum mechanics strikes down the term 'observer' of classical theory and suggests that we have part in the creation of our reality by the way we perceive it. (50) We determine our reality by the way we relate to ourselves and to others.

Living this useful truth could spell the end to the idea of an 'outsider.' We could see our multiple selves in flux and in relationship with a total archetypal, universal self (a relevant Jungian concept, which resonates with its ever living past and future through all of us. Benjamin Woolley in his study of virtual worlds, concluded that the physical realm could be regarded as a simulation of a deeper, purer reality, a virtual reality. (51) Today we cannot ignore the significance of such deeper reality, its reflection in the physical world. The important task then is to choose what we separate and connect together, embody and localise, not based on instant gratification, but based on visions of creative intelligence.

To find yourself in eternity, you differentiate and then combine.

J. W. Goethe

A PALACE OF MIRRORS

While strong views and disagreements in science are healthy, scientists cannot afford tunnel visions anymore. Rather than spread sensational thoughts about scientific raw materials, they must begin to share and be open to thinking in the context of human purpose, morals and ethics. Debates are now wide open, fast moving, resulting in rich connections across scientific disciplines. The physicist Danah Zohar relates 'Quantum Field Theory' to our experience (rather than theory) of consciousness, where all waves and particles that are apparent, 'stand out from' an underlying sea of potential that physicists call vacuum, not unlike mystical concepts of The Void). (52)

Equally relevant are findings about Chaos and Complexity (53), which now infiltrate all traditional sciences. Their hidden harmonies, their patterns across different scales that resemble each other in shape, resonate with the ideas of transpersonal psychology. Dreams, for example, exhibit similar patterns:

...the dream can see resemblances to the contents of other records filed under different headings - files that it would have never occurred to the waking ego to think of consulting. Highly practised is the skill of transposition, the dreaming brain can move whole memory systems into another key, or take two apparently different systems and detect hidden harmonies between them.

Anthony Stevens (54)

Why should we spend 25 percent of our life in theta rhythms, dreaming in rapid eye-movement sleep (REM), if there was not a self-organising principle at work which revises and re-assembles our memories according to our changing realities, and if not to bring us in resonance again with the larger organism of the self? Sufi poets call this universal self 'Aina Khana, 'the palace of mirrors, where the heart, seen as the depth of the mind, by holding reflections is thought to produce 'creative phenomena.' (55)

Cyberspace creates the distancing mirror-container for the practise of our imagination. Presently there is a seducing trance hanging over this novel electric space, but we might learn from it which reflections are worth holding and how to use *skilful* will rather than ego-control in the shaping of our world.

As a digit represents information within an electric matrix, a drop of water contains information about the ocean, so the human being holds energy and information as part of a universal mind. The difference is each one of us is endowed with more or less awareness that we are embodied, natural, mechanical, calculating and simulating beings, and, in addition, even if it represents only one per cent out of hundred, we hold a powerful spark, are animators, endowed with consciousness, imagination and will.

Foucault's vision points forward. We are on the verge of discovering new forms, new identities, new ways of being human, but it is imperative that we learn fast, there is a responsibility attached to consciousness: 'The forms we create are subject to moral evaluation.' (56)

Our simulacra affirm that we are already wired up in a universal calculus, without something as cumbersome as wires. However, no one programme we devise could control a universal mind, nor could the primary world function and nourish us without the layers of our dead ancestors, the useless, the weeds, rain, compost, the hiatus of nights. Instead there seems to be an endless potential for creating mythical realities. It should matter to us which realities we choose to embody, but in the end all our myths are virtual illusions which serve the process of a growing consciousness where: 'The ideal is the means and its breaking is the goal.' (57)

In the sense that Walter Benjamin speaks of 'the time of the new shot through with chips of Messianic time,' Mark Davies sees cyberspace culture as superimposed on our vast arcana of esoteric, religious and mythological traditions, and suggests, that its ultimate secret code is one's true name, one's real human identity. (58)

Some humility is required. Death remains the ultimate spinner of life. Our physical, psychological and spiritual growth takes place within the temporary limits of embodied context and relationships. To develop truly human qualities, we need myths as well as reason, we need the darkness of forgetting in order to heal and be redeemed as much as the light of consciousness in order to grow. In the parlance of the mystic, the moment of exaltation is in the immanent glimpse of truth, *The Curl of the Beloved*. Can the beloved remain the beloved if she is fully known?

NOTES

0 RAINER MARIA RILKE, my free translation. (see Bibliography)

1 MICHAEL FOUCAULT, The Order of Things: An Archaeology of the Human Sciences

2 MAYA DEREN, Anagram of Ideas on Art, Form and Film in 'The Art of Cinema,' p. 23

3 PABLO PICASSO, Oxford Dictionary of Modern Quotations

4 MAYA DEREN, ibid

5 MICHAEL BENEDICT, Cyberspace, p. 1

6 HENRI LEFEBVRE, The Production of Space, p. 46

--- KARL POPPER, Objective Knowledge: An Evolutionary Approach, pp. 106-152

--- ROGER PENROSE, Shadows of the Mind, pp. 411-420

7 WILHELM LEIBNITZ, referred to by Michael Hain in 'Cyberspace,' ibid, p 68

8 HENRI MICHAUX, quoted by Nicole Stenger in Cyberspace, ibid.

9 WILLIAM BURROUGHS, Nova Express, quoted by S. Bukatman, Terminal Identity, p. 19

10 JEAN FRANCOIS LYOTARD, The Postmodern Condition

11 JEAN BAUDRILLARD, Selected Writings, p. 208

12 JEAN BAUDRILLARD, ibid, p. 219

13 JEAN BAUDRILLARD, quoted by Lilo Berko in 'Wide Angle'

14 DONNA HARAWAY, Cyborg Manifesto, from 'our story CY' on website

15 DONNA HARAWAY, quoted by Hari Kunzru's 'The Unlikely Cyborg', in Wired, Dec. 96

16 WILLIAM GIBSON, Neuromancer

17 MARTIN HEIDEGGER, The Question Concerning Technology and Other Essays, p. 26

18 STEVE JONES, geneticist, University College London, Channel 4, March 1997

19 JEAN BAUDRILLARD, in 'The Ecstasy of Communication'

20 ANNETTE KUHN, ed, Alien Zone, Cultural Theory and Contemporary Cinema, p. 8

21 JEAN FRANCOIS LYOTARD, quoted by Benjamin Woolley, Virtual Worlds, p. 216

22 GREGORY BATESON, Steps to an Ecology of Mind, relating to the chapter called: Conscious Purpose versus Nature. (Lecture given in London, 1968)

23 FRANCIS CRICK, Journal of Consciousness Studies, Vol.1, No.1, 1994, p. 56

24 DANIEL C. DENNETT, quoted in The Sunday Times Magazine, 1. Dec 1996, p. 56

25 DR. EDMUND FURSE, Department of Computer Studies, University of Glamorgan

26 DONNA HARAWAY, Primate Visions

27 KEVIN KELLY, Out of Control, The New Biology of Machines, p. 31

28 HORST HENDRIKS-JANSEN, Catching Ourselves in the Act, p.257

29 JOHN SEARLE, two out of six Reith Lectures 1984: Minds, Brains and Science

30 STEVAN HARNAD, Why and How We are Not Zombies, on website

31 MARVIN MINSKY, The Society of Mind, p. 63

32 STEVAN HARNAD, The Symbol Grounding Problem, ibid, p. 5 of 15

33 DAVID CHALMERS, as in Sunday Times Magazine, 1. Dec. 1996, ibid

34 HORST HENDRIKS-JANSEN, Catching Ourselves in the Act, ditto, p. 338

35 MARSHALL MCLUHAN, Understanding Media, New York, New American Library, 1964

36 PAUL VIRILIO, The Vision Machine, pp. 6, 67 &71

37 SHERRY TURKLE, Life on the Screen, Identity in the Age of the Internet, pp. 22-24 & 81

38 ROGER CALLOIS, from an essay on mimicry, 1935, quoted in L'Amour Fou, 'Corpus Delicti' ed. Rosalind Kraus and Jane Livingstone

39 DANAH ZOHAR in collaboration with I.N. Marshall, The Quantum Self, pp. 112-113

40 WALTER BENJAMIN, Illuminations

41 WALTER BENJAMIN, Illuminations, p. 230

42 REV. DON CUPITT, quoted in The Sunday Times Magazine, 1. Dec. 1996, p. 56

43 JEAN BAUDRILLARD, The Ecstasy of Communication, pp. 40 & 50

44 KENNETH and PAUL COLBY, Depression 2.0, a cognitive therapy programme, referred to by SHERRY TURKLE in 'Life on the Screen,' ibid, p. 115

45 ALLUCQUERE ROSANNE STONE, 'Will the Real Body please stand up,' in Cyberspace

46 PAUL VIRILIO, The Vision Machine, pp. 73 & 35.

47 SHERRY TURKLE, Life on the Screen, ibid, p. 25

48 SHERRY TURKLE, Life on the Screen, ibid, p. 266

49 HENRI LEFEBVRE, The Production of Space, ibid, pp. 309-310

50 JOHN WHEELER in 'Experimental Test of Local Hidden Variable Theories,' 938 ff

51 BENJAMIN WOOLEY, Virtual Worlds, p.11

52 DANAH ZOHAR & IAN MARSHALL, The Quantum Society, p. 195

53 JAMES GLEICK, Chaos, Making a New Science, Heinemann: London 1988

54 ANTHONY STEVENS. Private Myths, Dreams and Dreaming, p. 90

55 HAZRAT INAYAT KHAN, The Mind World, in The Sufi Message, Vol. 8

56 MAYA DEREN, ibid, p. 9

57 HAZRAT INAYAT KHAN, ibid

BIBLIOGRAPHY

BAUDRILLARD Jean, The Ecstasy of Communication, Foreign Agent’s Series, trans. Bernhard Schultze and Caroline Schultze, New York 1988

BAUDRILLARD Jean, Selected Writings, ed. Mark Poster, Polity Press 1992

BATESON Gregory, Steps to an Ecology of Mind, Paladin 1973

BENEDICT Michael, Cyberspace, First Steps, ed. Michael Benedict, MIT Press, 1991

BENJAMIN Walter, Illuminations, trans. Hannah Arendt, London, Jonathan Cape 1970

BLADE RUNNER, commentaries on the film by Ridley Scott are my own

BUKATMAN Scott, Terminal Identity, Duke University Press 1993

BURROUGHS William, Nova Express, Grove Press, New York, 1964

CALLOI Roger, quoted in L’AMOUR FOU, ‘Corpus Delicti,’ ed. Rosalind Kraus and Jane Livingstone, New York, Abbeville Press 1985

CHANNEL 4, Black holes in Science, 4th March 1997

DAVIS MARK, Techgnosis, Magic, Memory, in Flamewars, ed. Mark Davies, Duke University Press, Durham and London, 1994, p 31 & p 50.

DEREN Maya, An Anagram of Ideas on Art, Form and Film, The Alicat Book Shop Press, Yonkers, New York 1946. In ‘The Art of Cinema,’ selected Essays by George Amberg, Arno Press & New York Times, New York 1992

FOUCAULT Michael, The Order of Things: An Archaeology of Human Sciences, trans. Alan Sheridan, Random House, New York 1970

GIBSON Williams, Neuromancer, Harper Collins pp 1995

GLEICK James, Chaos, Making a New Science, Heinemann, London 1988

GOETHE Johann Wolfgang, Verse: ‘Dich im Unendlichen zu finden, must unterscheiden und dann verbinden.’Quoted in the I GING, transl. Richard Wilhelm, Eugen Dietrichs Verlag, 1970

HARAWAY Donna, Cyborg Manifesto, Science, Technology and Socialist Feminism in the 1980s New York, Routledge 1998. Also ‘our story CY’ on website

HARAWAY Donna, Primate Visions: Gender, Race, and Nature in the World of Modern Science, New York, Routledge 1990.

HARNAD Stevan, Why and how we are Zombies & The Symbol Grounding Problem, as on Website

file:///CI/Backup/HARNAD 90.HTM, pp, 2 -15, from 11.17. 96

HEIDEGGER Martin, The Question Concerning Technology and Other Essays, trans. William Lovitt, New York, Harper 1977.

HENDRIKS-JANSEN Horst, Catching Ourselves in the Act, MIT Press, Cambridge, Massachusetts, London, England 1996.

JOURNAL OF CONSCIOUSNESS STUDY, Vol. 1, No. 1 1994

KHAN Hazrat Inayat, 'The Mind World,' from The Sufi Message Vol. 8, first publ. by Luzac & Co., London 1935, now with Element Books

KELLY Kevin, 'Out of Control, The New Biology of Machines,' Fourth Estate, London 1994

KUHN Annette, ed. 'Alien Zone,' Cultural Theory and Contemporary Cinema, Verso 1990

LEFEBVRE Henri, The Production of Space, trans. David Nicholson-Smith, Basil Blackwell 1994

LYOTARD Jean Francois, The Post Modern Condition, A Report on Knowledge, trans. Geoff Bennington & Brian Masumi, Minneapolis University of Minnesota Press 1984

MINSKY Marvin, The Society of Mind, Touchstone edition, Simon & Schuster Inc. 1988

OXFORD DICTIONARY of Modern Quotations, Oxford University Press 1991

PENROSE Roger, Shadows of the Mind, Vintage 1995

POPPER Karl, Objective Knowledge: An Evolutionary Approach, Oxford University Press 1979

RILKE, Rainer Maria, Sonnets to Orpheus, German text plus transl. by J. B. Leishman, The Hogarth Press 1967, p. 107 (transl. of Sonnet X, sec. part, is my own)

SEARLE John, Reith Lectures 1984, Minds, Brains and Science, The Listener, Nov. 15th & 29th 1984 and answer to critics , Jan. 10th 1985

SCOTT Ridley, Blade Runner (82), film based on a science fiction story by Philip Dick: 'Do Androids Dream of Electric Sheep?' 1968

STEVENS Anthony, Private Myths, Hamish Hamilton, London 1995

THE SUNDAY TIMES MAG, 'The Search for the Soul,' article by John Cornwell, Dec. 1. 96

TURKLE Sherry, Life on the Screen: Identity in the Age of the Internet, Weidenfels & Nicholson, London 1996.

VIRILIO Paul, The Vision Machine, Indiana University Press 1994, trans. Julie Rose, pub. British Film Institute 1994

WHEELER John, 'Experimental Test of Local Hidden Variable Theories,' Physical Review Letters,

Stuart Freedman & John Clauser, No. 28, 1972

WIDE ANGLE, Film Quarterly, Vol. 10, No. 4

WIRED, Computer Magazine, Dec. 1996

WOOLEY Benjamin, Virtual Worlds, Penguin 1992

ZOHAR Danah & Ian Marshall, 'The Quantum Society,' Flamingo 1994

ILLUSTRATION (front page):

TOLIMA, Brustschmuck in Form einer stilisierten menschlichen Figur 100-1000 n. Chr.,
Banco de la Republica, Museo del Oro, Santafe de Bogota.