CYBORGs

Cyborgism, Performance and Society

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Definitions

**performance n.** 1. execution, carrying out, completion. 2. a thing done, an action. 3. a feat, a notable deed. 4. a piece of work. 5. the performing of a play, display of feats etc. 6. an entertainment. 7. (of a vehicle etc.) the capacity to function (well). 8. (coll.) an elaborate or laborious action, a fuss. 9. a return on an investment. ~a. (of a car) capable of travelling very fast and accelerating quickly. (Cassell 1998)

"The *Oxford English Dictionary* cites related uses of 'performance' dating back over several centuries. No, the term 'performance' has not been coined in the past half-century. Rather, it has been radically reinscribed, reinstalled, and redeployed in uncanny and powerful ways. What has occurred has been the articulation and rapid extension of performance concepts into formalized systems of discourses and practices, into sociotechnical systems that have themselves become institutionalised." (McKenzie 2001:13)

**Cyborg** Manfred E. Clynes and Nathan S. Kline first coined the term, 'Cyborg,' to refer to an enhanced man who could survive in extra-terrestrial environments. They thought of cyborgs as "self-regulating man-machine systems,"(Kline 1960:XV) and created the world's first being to be called "cyborg" at New York's Rockland State Hospital in the late 1950s - a white laboratory rat with a tiny osmotic pump implanted in its body to inject chemicals at a controlled rate to alter its physiological parameters.
Abstract

Cyborgism and performance are perhaps on the face of it two different subject areas, and the many other topics covered or touched upon in this thesis on the face of it quite distinct areas of study. This thesis is a synthesis of these otherwise distinct fields of thought.

The main line of argument will focus around a discussion of performance and performativity, and how performance studies presents an understanding of identity and of culture that dovetails with sociological notions, in particular those which use the language of the stage, notably social interaction and actor-network theory.

The nature of cyborgism will become apparent through this discussion, particularly in discussion of the cultural phenomenon of the cyborg in fiction and in film. One of the primary concerns raised by this discussion and by the characteristics of the modern cyborg, however, will be the history, nature, and development of Modernism itself, from mediaeval times up to the present, and which will identify the Cyborg as its ultimate product.

The philosophical thrust of the thesis will be to highlight the problems inherent in the Modernist, scientific materialist approach to understanding the world, and contrast it with a counter-history of philosophical approaches both vitalist and holistic, thereby casting the Cyborg as a warning and a threat.
Dramatis Personae

a. The Cyborg

What is the cyborg? What does it say about us, yesterday, today, tomorrow?
The cyborg can perhaps be understood as a symptom of western society's fascination
with the ideal of the perfect body. This ideal is at least as old as the homoerotic
absorption of the ancient Greeks with the physical prowess and beauty of their young
men. As an ideal, it differs profoundly from the oriental approaches to physical health
and well-being that seek harmony - internally within the bodies of those who practice its
various arts, and externally between those bodies and the laws of heaven and earth.
The Greek ideal is focussed upon a single, Platonic Ideal: one Body that is Perfection
itself, never manifest, but to which all physical manifestations of the body must
aspire. (Graves 1955; Plato and Gill 1999)

Inasmuch as we in the West live today in a civilisation cradled in ancient Greece
and Rome, this ideal of physical perfection persists, albeit in new and more pervasive
forms. In the modern era the study of medicine, among other advances, has made this
ideal appear both more attainable and more desirable, both a right and even a duty in
our societies. Medical advances in the form of corrective work ranging from the life-
preserving to the cosmetic, and new social norms of health and fitness for all, and
expectations in the workplace, have come together to create an ideal for our bodies
today that is almost universally aspired to.

The cyborgs of today are everywhere apparent: 20-20 vision has become almost
a human right, whether attained by orthotic (external) aids such as spectacles or contact
lenses, or through laser surgery on the eyes; mobility and dexterity are available to
almost all of us, whether through replacement limbs or wheeled transport. A host of
different devices hide deep within the internal organs and bones of tens of thousands of
people, holding bones together, replacing whole parts of the skeleton, triggering the
pump mechanism of the heart, returning to us the smile taken from us by some terrible
accident. Millions spend a part of every day in some physical exercise routine, attending
to their diet, brushing their teeth, maintaining personal hygiene. Thousands of people
suffer from diseases directly attributable to our collective fixation with the ideal waistline.
At least as many suffer from diseases directly attributable to having simply given up. In
a myriad ways we are all compared and comparing ourselves to the ideal of the perfect
body, and eager to get as close to attaining it as it is possible for us to achieve.

The science fiction cyborgs of tomorrow represent a step further towards using
medical and prosthetic techniques, and all the latest technologies, to enhance the human
body toward a super-human ideal. Already we have developed wheeled transport for
ourselves – great outer casings of metal that we don like huge powered suits of armour –
that rush us about the surface of the planet faster than the fastest runner on earth. The
private car, after all, in the age of commodity capitalism, is as much a very expensive
high-tech suit as it is a mode of transport. We are cyborgs when we sit behind the wheel
– and our behaviour changes.

There is, in fact, a great range of different grades of cyborg, from simple
dependency upon an orthotic device – wearing spectacles or a hearing aid – through
incorporation of prosthetics like false limbs and pace makers, to total interdependence of
organic and non-organic components – like Robocop, or the Terminator. There are types
of cyborg that are pharmacological – those whose day-to-day lives are governed by the
drugs they take; exoskeletal – wearers of everything from Zimmer-frames to sports cars;
even bioengineered – people with robotic prosthetic limbs.
This thesis is not about such differences in degree. It is about differences in kind—between being human, and being cyborg (to whatever degree.) It is about our notions concerning the human body, and about what the cyborg represents among those notions. It is about our notions of the perfect body, about our technological attempts to make us all conform to the Greek ideal, as against the individual uniqueness of our own bodies.

This thesis asks the question, what is the cyborg? But it will not offer, in answer, a great list of examples of different degrees or grades of being cyborg. In this thesis we will be concerned with the profoundest philosophical level of what the cyborg represents in human society. We will be concerned with the phenomenon of cyborgism, rather than with its myriad manifestations. There will be no attempt to describe all the various different types of cyborg, to offer a taxonomy of different manifestations of cyborgism. Those types and manifestations that are described will be specific examples of particular aspects of the deeper cultural phenomenon.

How then will the problem be addressed? The primary philosophical ground upon which we must address the cyborg must be ontological in character—concerned with the profoundest level of what it means to be human—if we are to understand the difference in kind between being human and being cyborg. We must therefore use as our principle analytical tool an activity that defines us: performance. In this thesis we will address the cyborg through the lens of performance, in order to understand the phenomenon from the broadest—and the profoundest—possible perspective.

Performance is the key to understanding the cyborg, because being human is a performance, our every move and gesture a communication from ourselves to those around us. In every situation we wear the mask most appropriate to the moment, speak the lines that produce the desired effect. Being human is a matter of doing it. The body and the mind are part of a seamless fabric that only seems divisible to our thoughts. Every word that is spoken is both a movement of the larynx and a tremble of cochlea.
Every thought is a performance to the imaginary audience in our minds. Our bodies are so intimately bound up in the act of being ourselves that anything we do to our bodies has a profound effect upon who we are. The performance of our selves by bodies that have been changed by the phenomenon of cyborgism – bodies attempting to reach what is by definition an unattainable ideal - makes performance a central theme of this thesis.

Performance is the key to understanding the cyborg because it is our collective cultural performances in the West, in the modern era since the late 16th century, that have progressively fore grounded objects in relation to ourselves. Objects have become more and more important in our lives, such that society has become no longer about the relations between people, about the collective performances of people relating to one another, but about the relations between people and things, the cultural performance of people making and exchanging and using objects – even incorporating them into and onto themselves in our quest for the perfect body. The commodity-based culture of recent decades is an acceleration of this trend.

The cyborg is the figure that best captures this person-thing relationship. It is the cultural figure to which we have pinned our fears that there are risks to this kind of cultural performance centred around objects rather than on ourselves – that the fore grounding of objects in our lives as represented by the cyborg represents a threat to our current humanity; that the ideal of the perfect body has gone too far, and could lead us into a dystopian nightmare.
b. The author

The author's own background contributes to the form that this thesis is to take. As an introduction to the reflexivity that will be a (minor) feature of the thesis, I offer here a brief autobiography. I performed as an actor in at least one play a year from the age of six to the age of thirty-one. In my late teens and twenties I read a great deal of English and European literature, dystopian novels, and works of science fiction, and spent much time writing poetry and short stories – embracing narrative as a critical form through which to understand the world. In my late twenties, encouraged by a worsening spinal condition, I moved gradually off the stage and into the office, and undertook a Bachelors in Theatre, the more academic part of which consisted in an introduction to Cultural Theory. Following my degree I ran Arts Centres for a living – curating electronic art in the gallery as well as music and drama in the theatre – and undertook a part-time Masters in Cultural Studies specialising in Cybersociety, whilst learning how to make websites to advertise the activities at the Arts Centre. Since leaving the Arts world to undertake my PhD, I have been running my own small business making websites for academic departments, and training staff in web-authoring techniques – in particular how to make websites accessible to disabled users.

The interdisciplinarity apparent in my background is also a key feature of this thesis, which attempts to cover a great range of issues under the central umbrella figure of the cyborg. Furthermore, to do justice to such an iconic figure as the cyborg, and to reflect the centrality of the issues around identity that the cyborg highlights, I have presented this thesis as a narrative – indeed as a theatrical performance in itself - rather than in the traditional format. Thus we begin with this introduction to the characters, the traditional Dramatis Personae at the front of every play script. This narrative approach is in keeping with the crucial role of performance in the understanding of the cyborg, and with the notion of the 'seamless web' which unites all aspects of our lives – a notion we will return to often. But it is also in keeping with my own approach to life and to
learning: that to grasp, intuitively, the true gist of something, one needs to see it as a whole, rather than dissected in pieces before one; and that it is through story, through narrative, that one best comes to understand and can best express a complete picture, an overview, of any subject. (Somers 1994)

c. Theoretical Characters

The writers to whom I have been attracted and who have helped me to form the ideas expressed in this work are here briefly introduced in a short narrative outlining how each came to become a part of the theoretical background of the thesis. Again, the interdisciplinarity of both my own background and the general tenor of the project as a whole are apparent in the range of authors I have chosen. For the examination of the phenomenon of cyborgism at the profound level that is to be undertaken in this thesis, it is my belief that these authors, together, in the synthesis of their ideas which I shall present, provide the key to understanding the cyborg.

For an ontological approach to performance itself, I have turned to Judith Butler, with Erving Goffman and Richard Schechner in the wings. For a deep historical contextualisation and philosophical analysis of the social, I have turned to Michel Foucault. For an unravelling of the smoke and mirrors of the modern condition I have turned, not to the postmodernists, but to Bruno Latour, whose work on networks of relations embraces the objects in our society – and is thus essential to our understanding of the cyborg. Finally, for a glimpse of what it is that is special about being human, which becoming cyborg might cause us to lose, I have turned, through the eyes of Gilles Deleuze and others, to the vitalist philosophy of Henri Bergson. Whilst there are aspects of the work of each of these writers that conflict with one another, the linkages and overlaps are strong enough to have provided me with a synthesis of ideas upon which to base the thesis.
i. Judith Butler

The project began with the notion of performance – in particular the performance of identity. Following an introduction to the subject through reading Goffman's "Presentation of Self in Everyday Life," (Goffman 1990) the work of Judith Butler on Performativity (Butler 1990; Butler 1993; Butler 1997) came to form a cornerstone for my understanding of identity, and led me to a broader awareness of the workings of historical change.

As an actor, I had always understood how my own identity formed a part of the roles I played on stage, and how those roles in turn had an impact upon my self. Schechner's work on performance theory had informed this understanding, through his notions of efficacious performance, and 'restored behaviour'. (Schechner 1982; Schechner 1985) That, for Butler, each role pre-exists its performance, and carries the weight that it does because of that, chimes perfectly with the actor's knowledge of what gestures and attitudes the audience already know and will therefore best understand. To understand my own identity as a role I played in social settings was both a revelation and confirmation of what I had already suspected. As a gay man I have all too often played a role in certain social situations that only reflected part of me at best, and sometimes directly contributed to the misconception others made of me – thereby remaining, in that social context, in the closet built by the assumptions of those around me.

So Butler's post-feminist, post-gender conception of performative identity chimed well with my own understanding and experience. That human beings perform gender was something I knew only too well. That the performance of identity ran as deep in our lives as the very physical, bodily attributes of gender, made her work crucial to the understanding of the cyborg, and the ideal of the perfect body.

Her notion of citationality is particularly important, though – that the roles we perform pre-exist us, that we cite them in the knowledge that they will be understood
because they are as known to those to whom we perform them as they are to us. Crucially, this citational aspect of Butler's performativity allows performative behaviour to fail, by implying that only specific performative actions will succeed. This is very important, because it allows choice among possibilities, trial and error, and the development of "personhood" through experience. (Goffman 1990:30) This combination of predetermination and choice in the nature and expression of our identities rings very true to me, and provides insights into the nature cyborgism as we shall see in Chapter 2. It acknowledges the immense extent of the social construction of our identities whilst leaving room for struggle, individuation, and personal achievement.

Butler, then, with Goffman and Schechner in the wings, forms an almost ontological foundation for the theoretical background of the thesis. Performance, in the form of performativity, provides the core understanding of what it is to be human – body and mind – in this thesis: in short, that we perform our identities in the contexts and situations in which we find ourselves, that each performance is of a role that pre-exists us, and carries the weight that it does because it is known to both performer and audience before its presentation, and that these performances are not guaranteed to work, but open to failure, giving us choice, and the opportunity to grow through experience.

**ii. Michel Foucault**

The citational aspect of Butler's work, moreover, dovetails neatly with Foucault's concept of statements. Butler is explicit in acknowledging her debt to Foucault, despite Foucault's apparent disinterest in – even hostility to - feminism. Butler's feminism is in truth as post-feminist, as non-gendered as Foucault's approach to sexuality, in this author's opinion, and the tensions between them perhaps somewhat overplayed. Foucault's approach to sexuality is as much that of a social constructionist as is Butler's approach to gender. His study of sexuality rests upon a study of identity, because it
addresses the fundamental question of the evolving nature of the self that "experiences" emotions, and places both desire and the desirer in historical context.

It was to Foucault that I turned for a deeper understanding of history, of the historical contextualisation and continual unfolding of notions of the self, and of the body. It was to Foucault that I turned for an understanding of – as he terms it – the archaeology of knowledge (Foucault 1977; Foucault 1994; Foucault 1995; Foucault 1995; Foucault 1997). Foucault's units of discourse, which he terms, 'statements' gain their power and validity from the status of those who make them, and collectively come to form bodies of knowledge known as disciplines or fields of study. These he dubs 'discursive practices' which collectively form into epistemes that roughly equate to historical periods. These notions of the historical flow of discourse, of the contingent structure and evolution of knowledge, have a fluidity that corresponds well with the multiplicities that I found in Butler, and together formed a space for understanding the present. Kuhn's (Kuhn 1970) notion of paradigms was clearer but simplistic in comparison.

Foucault’s notion of political technologies of the body, and the progressive disciplinization of the self over the last few centuries, was particularly fascinating as a clue to the nature of the phenomenon of cyborgism. His work on the creation of our concepts of sanity through the creation of the medical discipline of mental health; the creation of our concepts of good citizenship through the creation of the prison system; and the creation of a range of character types and whole modes of desire through the repressive attempts in recent centuries to render sexuality invisible or at least severely restricted, collectively provided an extraordinary insight into how social technologies of organisation, power and control have progressively shaped not just our lives but our bodies themselves, our self-concept, the individual performances of who we are. These social technologies moreover have shaped us in such a way as to maximise the efficiency of the making, exchanging and use of objects that our society has become so exclusively focussed upon.
Foucault, then, outlines the map of contemporary social roles from which we are able to select who we will be in any given situation. This map derives from the social environment of control where power and knowledge are intertwined and focussed upon the human body as the object of their interplay. The human body is exposed as object and target of power in the modern era. "It is manipulated, shaped, trained, [it] obeys, responds, becomes skilful and increases its forces.... [it is] constituted by a whole set of regulations and by empirical and calculated methods relating to the army, the school and the hospital, for controlling or correcting the operations of the body." (Foucault 1977:136)

Foucault's meticulous description of the operations of the ideal of the perfect body in contemporary society is thus crucial to this thesis on the phenomenon of the cyborg. Foucault's work lays out both a historical context for the roles that we perform in everyday life – one dominated by issues of power and control - and a mechanism by which we can understand how that historical context and the roles it includes are subject to continual change, and progressively more pervasive control. Butler's performative identities cite from a canon of disciplinaion, and the ideal of the perfect body is subject to continual revision in ever finer and more prescriptive detail.

iii. Bruno Latour

Foucault's idea of disciplines as discursive practices seemed a very apt description of the scientific technologies that have evolved since the 16th century. But he has little to say directly about the objects themselves, for all that his ideas on technologies of the body ring so true. Writers in the field of science studies, (variously described as the sociology, history, political science, philosophy or anthropology of technology,) however, have addressed just this issue, and it was a pioneer of this field, Bruno Latour who seemed best able to cater for Foucauldian flows of history in his theoretical approach to the role of objects in society. Other authors, from different fields – for example Callinicos, whose otherwise good critique of post-modernism and
commodification was nonetheless rooted in 19th century political economy – seemed unable to take in the depth, breadth and fluidity of Foucault's epistemic backdrop, and did not offer a satisfactory theoretical overview of objects in human culture.

Latour's work, however, is massive in its scope, and cuts to the very heart of the collective cultural performances in the West since the late 16th century. In his seminal book, "We Have Never Been Modern" (Latour 1993) he dissects the origins of modernity in the late mediaeval era and breaks down the divisions set up in Western society at that time in a way – to my mind – startlingly convergent with Foucault. His depiction of modernity as a paradoxical double-think producing precisely what it seeks to deny almost requires Foucault's notion of discursive practices to be credible. Together, the two notions carry great weight. Latour stresses the seamless web which unites everything, refusing to bow to the arbitrary demarcations of disciplines and fields of study, focusing upon the hybrids that link them, and upon the networks that ultimately unite them all. Here Latour and Foucault are in harmony.

Latour's break with the sociological mould chimed well with my naturally interdisciplinary leanings. To him, a study of society that only dealt with people is no study of society at all. One glimpse at a newspaper presented him with issues that directly linked "the most esoteric sciences and the most sordid politics, the most distant sky and some factory in the Lyon suburbs, dangers on a global scale and the impending local elections or the next board meeting." (Latour 1993:1) The network of relations that pulls these disparate elements together Latour dubs a seamless fabric of 'nature-culture' – or a seamless web.

Latour's work brings the objects in our society into the theoretical framework. To paraphrase his introductory comments from "We Have Never Been Modern," (Latour 1993:3-5) no longer is it acceptable to speak of things as being either pertaining to nature, to politics or to discourse. When in this thesis we discuss the intricacies of neuro-prosthetic chip-sets, brain chemistry, and variations in the design of wheelchairs, this is
not merely a discussion of science and technology, merely a set of delineations of organs and artefacts as things-in-themselves. It is about how these things fit into the social construction of our identities and of our bodies. When in this thesis we discuss the inner workings of the laboratory culture of empirical science that produces/studies these objects, we will not be reducing science to mere politics, the social climbing of ambitious scientists, or the effect of the market on fashion in design. It is about how such social contexts and the exercise of power and knowledge in society fits into the process by which artefacts and scientific theories come to be produced, how that process is socially as well as scientifically contingent. Nor, when discovering these networks that link the social and the technical, will we be reducing both to mere text, mere discourse, and the games of language. Real people's lives are directly implicated and involved in these networks, real objects with real impact and importance run through them, and though the referent-less text gives us insight, it, like anything else, can in the end never entirely divorce itself from the material substrate upon which it is founded. (Hayles 1999)

At the interstices of Latour's seamless fabric wherein these networks stretch their tendrils like Ariadne's web, the cyborg is to be found. This interstitial cyborg unites Butlerian notions of performative identity, the performance of Foucauldian prescribed roles within the matrix of power-knowledge in our society, and the Latourian role of objects in nature-culture. The cyborg performs the roles that pre-exist it in the disciplinated Ideal body to which it aspires, at the nodes of networks that unite people, objects, technologies, discourses, organisations... ultimately the cyborg touches on the relation between science and consciousness. It is also often a very human story, about pain, false limbs and the barriers and prejudices in social attitudes to disability. This thesis does not shy from such human issues, but attempts also to weave into its fabric the personal and the mundane.
iv. Henri Bergson / Gilles Deleuze

If there is a difference in kind between being human and being cyborg – which this author believes there is – then how to define it, how to isolate and describe it? For if there is no difference then what is to stop us all becoming Robocop as soon as the technology becomes universally available? The thesis takes in the work of writers like Hayles (Hayles 1999) and Dreyfus (Dreyfus 1979; Dreyfus 1986) to question the very possibility that digital technology can ever be applied in this way outside the realms of fiction, but this in itself does not answer the fundamental question – is there a difference in kind?

For clues to the debate about this one need not look far. The Vitalist tradition in western thought, albeit something of a counter-tradition, is easy to find, and not as completely consigned to history by modern science as one might expect. In brief, vitalism has tried in various ways over the centuries to demonstrate that there is something unique about life, about living beings, that sets them apart from non-living things. Right up to the middle of the nineteenth century even most mechanists used some vitalistic ideas in their work. Modern chemistry, however, sought successfully to completely discredit any notion of 'substantival vitalism' – the idea of some physical/material essence unique to living beings.

But ‘holistic vitalism’ – focusing mainly upon consciousness as the unique attribute of the living – has never been properly contested by a scientific tradition that has never properly addressed the fact of consciousness, itself, and relies largely upon what some would describe as a lower form of thinking. (Dreyfus 1986) Perhaps the best proponent of such vitalistic theories, in the early decades of the twentieth century, was Henri Bergson, whose "Creative Evolution" (Bergson 1944) was at the time celebrated as a work of great genius. That the whole field fell out of favour in the wake of the Nazi's use of some ideas from the vitalist fringe did not stop Gilles Deleuze from rediscovering it
in the 1960s and placing Bergson’s work at the very foundations of post-structuralism.
(Douglass 1992)

Naturally there are tensions here between Latour’s scientific leanings and Bergson’s distaste for intellectualism. Hayles’ insistence that all information has a material base needs to be carefully squared with the notion that consciousness exists as an effect of the whole being greater than the sum of its parts. Yet Bergson does not deny the facts of empirical science, any more than does Latour, in his reconceptualisation of intellectualism, and at no point suggests that his \textit{élan vital} is in any way either substantival or immaterial – it is, like Butler’s performativity, that reality is a thing done, and the continual and unceasing doing of it is the spark that Bergson is describing.

It is a shift in prioritisation, a new understanding and revaluing of the intuitive faculty of human consciousness for which Bergson is best remembered. Intuition, as underlined by Dreyfus, is not some supernatural gift, but the everyday skill of holistic grasp – a higher level of skill than the "calculative rationality" of pedestrian science.(Dreyfus 1986:36) Furthermore, the apparent discord between Bergson’s view of the world as an interrelated whole, and Foucault’s world of epistemic collections of discursive practices, is not as deep as it first appears. On the one hand, Bergson’s Vitalism can be seen as but one Lyotardian metanarrative (Lyotard 1997) among many running through the episteme, and valued for its contribution. But on the other, Foucault’s seemingly disparate world of discursive practices and shifting epistememes can be seen as precisely that which continually unfolds at the crest of Bergson’s present, united and interrelated in the manner of Latour’s seamless web, the network of relations that links everything together in the end.

Probably the single most crucial idea from Bergson’s work, for this thesis, is the reconceptualisation of space and time. For scientists (at least since the late 16th century) time has been a fourth dimension through which spatially defined objects move. For Bergson such a division was purely for intellectual study of the past. Time and Space
were not divisible for Bergson in the ever-unfolding present. Consciousness sits at the
crest of that unfolding and the seamless web of reality unfolds before it, becoming dead,
fixed matter as it passes. Consciousness – specifically the intuitive faculty – is here at
the pinnacle and core of the Real – conceived as duration – *durée réelle* - rather than as
static existence.

In sum, I had came to see identity as something that performs pre-existing roles
(Butler) in social settings determined by overlapping, fluid sets of discursive practices,
(Foucault) many of which require an unhealthy double-think (Latour), and is at all times
surrounded by objects whose influence upon those settings and those discursive
practices is greater than the double-think wishes to allow us to believe. But that identity
is conscious, and making choices – so long as the objects do not come to control the
living so completely that that consciousness becomes forever excluded from the higher
potential of which it is otherwise capable. For that was the point that Bergson finally
wished to make – that the intuitive faculty, making choices at the crest of the unfolding
present, was the means to our individuality, the means to creating personhood. It is this
very means, and thereby the fruits it can bear, that we risk losing, in the progressive fore
grounding of objects in our society, on the march toward becoming cyborg.
d. Props and Stage

So, beyond reading the works of the theorists introduced above, in undertaking
the research toward producing this thesis, what did I do, and why did I do it that way,
and how did that feed in with my interests?

There is, amongst the many articles, books and texts on cyborgs, a great deal of
theorising and little if any fieldwork that this author could find. I wanted to redress this.
Specifically the notions of cyborg performativity had been theorised, but not empirically
studied. This thesis does not attempt any empirical study. Such an approach would lend
itself best to the taxonomy of degrees of cyborg this thesis does not offer. But in
keeping with the approach to the thesis as a performance in its own right, it needed
characters that could speak – not just the theoretical characters granting the
philosophical and ontological backdrop against which the phenomenon of cyborgism
would be discussed – but real people whose lives are directly involved in the
phenomenon, whose ideas and experiences could inform the discussion in new ways.

These real people, as fieldwork characters, would add weight to the voices of the
theoretical characters, and allow the author to play the two types of characters off
against one another – like characters in a play – in the spirit of the notion that all drama
is conflict. To include these real people in the performance of the thesis, I needed only
to interview them, and to include excerpts from the transcripts of those interviews within
the thesis, allowing their voices to be heard, alongside those of the theorists, with my
authorial voice weaving the overall narrative between them. As Goffman describes:
"what talkers undertake to do is not to provide information to a recipient but to present
dramas to an audience." (Riessman 2003) The dramas presented by real people to
myself as audience-interviewer thus become characters from fieldwork that speak in this
thesis to you, reader and audience to the overall performance. What my interviewees
said to me, then, I present in this thesis not as truth, nor as empirical fact, but as the
performances of individuals carefully chosen for the significance their contribution could
make to the overall performance of the thesis. These performances, moreover, are taken at face value, for the role they play in the overall performance, rather than ethnomethodologically dissected as performances in themselves.

I identified four categories of people to interview: performers working in the field of cyborg performance art; disabled people whose bodies had been modified; scientists making prosthetics; and the main funders of technological research – the military.

The first category was relatively easy – I knew people who could put me in touch with these performers, and I quickly secured interviews with two of the leading figures in the field – Stelarc, and Eduardo Kac. The second category was the most difficult, in many ways, not least because of the ethical dimension of undertaking such interviews. As it turned out, approaches to the prosthetic department in the university for assistance in identifying potential interviewees went unanswered. However, one disabled person, Ju Gosling, author of the website "My Not So Secret Life as a Cyborg", attending a Performance Research conference and giving a paper about her experiences, gladly agreed to give me an interview, and from her experience and awareness of the issues gave me probably a far more insightful interview than I might otherwise have been able to achieve.

For the third category I simply made a search on the internet. Most of the cutting edge prostheticians seemed to be based in the US. Of particular interest were the very small number of neuro-prostheticians, and the celebrated Utah Array – a tiny chipset that, once implanted in the brain, can both read and transmit signals between brain and computer. Fascinated, I wrote to its inventor, Professor Richard Norman, in Salt Lake City, and he agreed to give me an interview.

None of the other scientists I approached was able to grant me an interview at the time but one of them wrote to me to tell me about the forthcoming conference, in Washington DC, run by the US Department of Defence, entitled "Exoskeletons for Human Performance Augmentation.” This would be perfect for the fourth category. Having read
Ballard’s Crash (Ballard 1995) I was already interested in how the car forms an inorganic skin to a specific and very modern role played out by huge numbers of us in the west every time we sit behind the wheel. How much more so would the inorganic skin of a military exoskeleton – a high tech suit of armour - make its impact upon our personalities!? 

So I had four interviewees and the proceedings of a conference at which I was the only cultural theorist – all other attendees being either biomechanics or military personnel. This forms the fieldwork for the thesis. The performance artists, disabled artist, and scientist are here briefly introduced:
e. Fieldwork Characters

i. Stelarc

Stelarc is perhaps one of the foremost 'cyber performance artists' in the world. Originally from Sydney, Australia, between 1976 and 1988 Stelarc suspended his body 24 times with insertions into the skin, in different positions, situations, and locations. Having thus "defined the limitations of the body" he found himself drawn toward developing "strategies to augment its capabilities – interfacing the body with prosthetics and computer technologies." (Stelarc 1997) Stelarc's principle contention, as a Performance Artist, is that in the modern, technologically advanced world, the human body is fast becoming obsolete - a hindrance to our further advancement. In his performances Stelarc seeks to sketch out for us what he describes as post-evolutionary strategies for a post-human world.

Stelarc is thus to be regarded as a pioneer of cyber performance art, and an interview was undertaken with him in June 1999.

ii. Eduardo Kac

Eduardo Kac is an Interactive Artist originally from Brazil and now based in Chicago. Kac's work is located at the hinge of the cultural and the scientific, prompting searching questions of the relationship between the two in a fast-changing world. His experiments in particular with the notion of the 'wet interface' between human and digital make his work of profound interest to this thesis. Neither promoter nor opposer of technological advance, Kac instead uses his work to highlight potential problems, and to critique unthinking acceptance of new technologies and unthinking rejection of them alike.

An interview with him was undertaken in November 1999.
London based Ju Gosling, a.k.a. Ju90, is the author of the website, “My Not So Secret Life as a Cyborg”. She is an academic, an online artist, a registered disabled person, and a theorist about the life she herself lives, and the many ‘identities’ she performs. To assist her with her spinal condition she at various times wears a brace that she has decorated and modelled as a fashion item, or makes use of a wheelchair, and of crutches. Her insights in particular into the modern medical establishment as experienced by those disabled by our society are of especial note in this thesis.

An interview was undertaken with her in January 2001

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Together, these three individuals – their work, and the interview transcripts – comprise a body of research into contemporary cyber performance art to which I shall refer throughout this thesis, whilst discussing the many and varied issues, and other personalities, which the subject of the thesis raises. They are by no means the only individuals worthy of such study, but, nonetheless, in the opinion of this author, to be regarded as highly suitable, both as exemplars in the field, and inasmuch as they are of particular relevance to this thesis and the issues which this author wishes to explore. By referring back to these three individuals and their work throughout the thesis, the author hopes to be able to focus each of the issues and personalities discussed back to the notion of performance, to the centrality of performance as a trope for understanding post-industrial societies, as an ontological key to understanding ourselves and our role in the world, and, crucially, as the key concept in fleshing out the nature and technics of the Cyborg.

*
iv. Professor Richard Norman

Richard Norman is Professor of Bioengineering at the Centre for Neural Interfaces at the University of Utah, Salt Lake City, USA. He is also a Director of Bionic Technologies, Inc. It was at the Centre that the so called Utah array was first developed, under his guidance. This technology is currently in use at other centres around the world, where it provides a vital link between the central nervous systems of rat, cats, monkeys and other laboratory animals, and the computers used to study their brain patterns. Human trials have already begun, in Salt Lake City itself.

Richard Norman’s work is exemplary of the scientific/technological approach to which vitalism is counter, and his ideas are presented in this thesis for the purpose of critique.

An interview was undertaken with him in March 2000.
f. Thesis as Performance

The seamless fabric of human society and all the objects that are a part of it – the seamless web of human reality – is a central notion in this thesis, as we have already seen. In order best to weave a web of relations between disparate sources, and divergent fields of study, to best reflect the interdisciplinarity of the subject matter and of this author's approach to it, this thesis is presented as a narrative, as a performance in itself. Echoing the 'cut-n-paste' style of some beatnik novels, it dips into areas of study sometimes only briefly before making lateral leaps into other subject areas – the purpose being to establish in the reader's mind the clear link only such radical juxtapositions can elucidate.

If the cultural figure of the cyborg, performance, the seamless web of human reality, and consciousness are four of the primary themes of this thesis, then a fifth and perhaps overarching theme is the notion of holism – the idea that the whole is greater than the sum of its component parts. Wholes are by nature circular or spherical, and do not happily fit into the linear form of a traditional thesis. Ideas that seem best to present towards the beginning often require ideas as their foundation that seem best to present towards the end. The 'cut-n-paste' approach is the means I have chosen to overcome this problem, and I must ask the reader's patience if at times things do not seem quite clear – read on, for the explication is not much further ahead, and once the end has been reached all should become clear. The whole thesis, I hope, will be more than the sum of its component parts.
Introduction

Cyborgism and performance are perhaps on the face of it two different subject areas, and the many other topics covered or touched upon in this thesis on the face of it quite distinct areas of study. This thesis is a synthesis of these otherwise distinct fields of thought.

The main line of argument will focus around a discussion of performance and performativity, and how performance studies presents an understanding of identity and of culture that dovetails with sociological notions, in particular those which use the language of the stage, notably social interaction and actor-network theory. The second, parallel line of argument will focus around science since the 16th century, and how science studies presents a performance-related understanding of technology and the artefacts in modern societies. Together, these two lines of argument will be used to elucidate the phenomenon of cyborgism.

The Cyborg will become apparent particularly in discussion of the cultural phenomenon of cyborgism in fiction and in film. One of the primary concerns raised by this discussion and by the characteristics of the modern cyborg, however, will be the history, nature, and development of Modernism itself, from medieval times up to the present, and which will identify the Cyborg as its ultimate product.

The philosophical thrust of the thesis will be to highlight the problems inherent in the Modernist, scientific materialist approach to understanding the world, and contrast it with a counter-history of philosophical approaches both vitalist and holistic, thereby casting the Cyborg as a warning and a threat.

The thesis is broken into four chapters: Performance, Performativity, Cultural Performance, and The Playwright. Performance is thus introduced in a general and historical context and its theoretical analysis of identity examined. There is then an
analysis of how populations of performed identities constitute cultural flows, followed by
the question of who the author of each such performance might be considered to be,
where the Will might be situated in the performance of roles. Alongside this
examination of performance, and dovetailing with it, Scientific Materialism from its birth
in the Renaissance to the present day is examined, analysed, many of its foundational
assumptions undermined, and some of its basic precepts opposed, in an examination
which mirrors that of performance, beginning with a historical backdrop, then analysing
the performative nature of individual artefacts, the cultural impact of technology over the
last few hundred years, and finally the thorny questions of technological determinism in
social networks.

Thus in the first chapter we shall look in some detail at the nature of
performance and performance studies, and undertake a critical examination of the origins
of Modernism as a backdrop to our further examinations. Then in the second chapter we
shall examine Performativity, taking a close look at the nature of identity, and the
performative nature of our individual actions, and, introducing science studies and Actor
Network Theory propose the notion that artefacts should be considered not merely as
actants but as performative actants in actor networks. In the third chapter, Cultural
Performance, the nature of narrative will be discussed and followed by a literature review
of the cyborg in fiction and film, the cyborg in scientific endeavour, and the cyborg in
contemporary theory, all of which will then be contextualised in a cultural critique of the
modern episteme from a performance perspective. Finally, in the fourth chapter, The
Playwright, rhetoric itself will be drawn into the performative networks of people and
things and the problem of agency will be addressed, leading to the conclusion that the
Cyborg is a fatal strategy.
1. Performance

In this first chapter we shall begin with some introductory comments on the history of performance, and then move quickly onto a discussion of anthropology and theatre. The kind of anthropology to be undertaken in this thesis is not a traditional anthropological approach, and some time will be spent justifying the use of the term before proceeding. We shall then undertake an ‘anthropological’ study of the birth of modernism, focusing upon the contrast between rationality and holism.

The chapter is broken into three sections: an introductory overview introducing performance studies; the anthropological examination of the birth of modernism and contrasting of the rational and holistic approaches; and a conclusion.

a. Introductory overview

   i. A quick history of performance

Performance is one of the most ancient of human activities. It is arguable, that it is in fact a constitutively human activity, in that it is often the ‘rituals’ and ‘ceremonies’ associated with burial that are cited as some of the first signs of truly human behaviour amongst our ape-like ancestors. A performance is something done by one person for another – even if that other is not present – it is always something done in relation to an other, and as such is bound up with the origins of language and gestural communication. To speak a word is to perform the score which both speaker and hearer share knowledge of as the bearer of a specific meaning – even if the hearer is only oneself. A complete set of words and actions such as a ritual, for all the improvisation and site-specific variation it may entail, is by definition the repetition of a known formula, the re-doing of what was done before; or, as Richard Schechner put it, in the phrase now so famous amongst those engaged in Performance Studies, “restored behaviour” (Schechner 1985). That constitutive act of early man by which many deem him to have marked himself out
for the first time as more than ape: the 'ritual,' is a performance, the playing of a score or script that was created and laid down to be brought out specifically for the purpose for which the ritual was undertaken (Schechner 1985).

Perhaps parallel to the development of ritual, though by its nature unmarked or recorded in the same way, was the performance of scores and scripts intended for purposes less weighty than ritual – fireside songs, poems, and re-enactments – that may be regarded as the origin of history, the source of legends, myths, and morality tales, the means by which the wisdom of experience is transmitted from person to person, and from generation to generation. "Tell us again about the day you killed the bear, granddad!" Over time, this becomes the story of how a legendary hero slew a great beast. Indeed the individuals who learned and performed these rituals and stories well, may be regarded as contributors to the development of power relations and politics within and between family and tribal groupings of early humans - the shaman figures who stood alongside those whose performance of daring feats and displays of physical prowess earned them the respect of their peers (Conquergood 1992).

In the urban society that came into being some twelve or so thousand years ago, as people settled into a built environment, a division of labour occurred, and the performance of ritual began to take place in purpose-built temples, and the stories and re-enactments, in what we now know as the Theatre (Beacham Richard 1987). Theatres, like temples, came in many different guises and forms – from the grand Classical amphitheatres to the box in the corner of the Inn or the tent erected for a day on the village green. But the link between ritual and theatre was not broken, and at various times over the centuries the power of the performers of rituals was brought to bear, proscribing what performances were and were not allowed outside the temple, and frequently had the theatres simply shut down (Leinwand Theodore 1999).

This link prompted Schechner (Schechner 1982) to propose a model for performance in the form of a braid of two separate but intertwining and interrelated
themes: entertainment and efficacy. At one extreme, for example in the temple, performance is deemed to be "efficacious": it is the purpose of the performance to enact change – from the rain-dance of the plains-dwelling shaman, to the transubstantiation of high Catholicism, to the entreaty of a simple prayer. At the other end of the spectrum, in pure entertainment, there is scarcely a 'purpose' - the point of the performance is merely to be enjoyed, with no lasting effect, within the strict and comfortable confines of a known relationship between audience and performer. (Schechner 1982)

In late twentieth century thought, and in several otherwise unrelated fields, the notion of performance became central to the ideas of several thinkers – to the extent that Herbert Marcuse even argued, as early as the mid-1950s, that the emerging post-industrial societies would be governed by what he called "the performance principle." (McKenzie 2001:3) In sociology, both Merton and Parsons were important in the development of role theory, which, later, and of particular relevance for the concerns of this thesis, was further developed in the writings of Erving Goffman, whose seminal 1959 book, "The Presentation of Self in Everyday Life" (Goffman 1990) launched the language of the stage into discussion of face-to-face interaction. Indeed, Goffman "found theatre everywhere in everyday life." (Schechner 1985:3)

Parallel with these ideas, during the 1960s, a movement began amongst performers to try to bring performance out of the theatre, and 'back' into everyday life. The "happenings" and experimental work of the late '60s and early '70s and the related political theatre, or 'agitprop', were all attempts to re-situate performance in the 'real' world, to challenge our perceptions of the nature of performance and free it from the confines of a format that had become as fixed as the walls that contained it (Schechner 1982).

Central to these efforts was the growing appreciation of the role of performance in everyday life, the emerging understanding that performance as a concept could help us to comprehend ourselves and our societies in new and revealing ways. By the 1990s
the elaboration of the concept of Performativity by Judith Butler and others, standing upon the shoulders of J.L. Austin's work on performative speech acts and Michel Foucault's delineation of the power-knowledge matrix of modern life, had brought the notion of performance to the very crux of who we are, of what it means to be human. The experimental theatre of the '60s and '70s had become, in the '90s, Performance Art — a new and exciting genre outside of the confines of any walls or restrictions not of its own choosing.

In the same post-war period, and in scientific fields in particular but not exclusively focused upon the newly emerging world of computing, the notion of technological performance grew to prominence. We are all now used to concepts such as high performance cars, performance indicators, and even the performance specifications of complex computer systems. As consumers, we are daily bombarded by advertisers' claims for the 'performance' of their products. The US boasts several High Performance Computing Centres at prestigious universities. The 'cultural' performance world of rituals, theatre, and sociological and ontological research seems very far from, say, the notion of the comparative performance of metals and polymers. But, as McKenzie points out, although the "two performance paradigms" — cultural and technological — "know very little of one another's research, ... their practitioners encounter, and often enact, one another's concept of performance on a daily basis, even as their fields have grown ripe alongside one another."(McKenzie 2001:9)

The correlation between these two notions of performance is, however, deeper than merely metaphorical — the fact that they both use the same word. Performance, on the profoundest level, is about action; it is process. From the point of view of performance, a person or an object is only as good as what s/he/it does, and how well s/he/it does it. From the point of view of performance, it is only in the process, in the act of "doing", that we and our artefacts may be judged. Performance, as a notion, situates existence in time, defines actuality as action.
In the midst of this strange correlation between cultural and scientific notions of performance, come two things that will be of crucial importance in this thesis: the academic work of Bruno Latour and others, who weave the worlds of people and things together into Actor Networks, and, the artistic phenomenon of cyber performance art.

Performance, then, is the key concept of this thesis, and the lens through which the nature of the Cyborg will be discussed. In the following chapters an examination will be undertaken of the nature of Performance: from an anthropological perspective; as "cultural performance" of norms and tropes; in the nature of identity itself and the close relationship between Performance and Performativity; concerning the relationship of people and things – in particular the stuff of technology; and lastly in respect of the playwright – the question of the agent and author of all that we perform. Through this examination of performance the nature of the Cyborg will be gradually revealed: its location at the fracture between the linear and holistic; its pole position in the expression of what is labelled 'cultural lag' in the norms and tropes of cultural performance; its centrality as the perfect contemporary figure for the performative; how the Cyborg epitomises and embodies the heterogeneous networks of people and things; and how the post-human technologies of cyborgism and the nature of intuition prove mutually exclusive in the question of agency.
b. Anthropology and Theatre

This second section of the first chapter is divided into two parts: the first focusing upon the contrast between separation and unity through a discussion of anthropology, and a justification of the use of the term that is made in this thesis, followed by an ‘anthropological’ examination of the birth of Modernism, consisting in a historical backdrop to the events which are identified as being the origins of modernism, and then an examination of those events themselves. The second part of this section will then contrast rationality and holism through use of an original interview with a respected neuroscientist offset by the ideas of one his rivals; through a series of examples based upon the interview material gained from the three performers; through an examination of cybernetics and one of its principle detractors; and finally through re-introducing the ideas of a philosopher whose work has fallen out of favour: Henri Bergson. In the last part of this section we shall return to performance studies and anthropology to summarise the section.

i. Separation vs. unity

Whether to divide up, reduce to its component parts and through examination of its constituent elements come to understand a thing or whether to grasp in one overall assessment the entirety of its united whole: this is the crucial question that is addressed in this first part of this section. We shall see that it is by no means a simple question, and that there are many answers.

I) Anthropology & Performance

To seek to examine the nature of Performance from an anthropological perspective, and thus shed light on how the Cyborg sits at the hinge of the linear and the holistic, I must first qualify such an approach by disclaiming any grounding in formal anthropological or ethnographic studies, and by foregoing any claim that the
'anthropological' perspective I am offering is one that an Anthropologist might have. The justification for using such a term perhaps sits alongside the use, in critical theory, since its introduction by Foucault, of the term 'archaeology' – not to refer in any way to the digging up of ancient remains, but rather as a metaphor for a method of critical enquiry. Anthropology, in the traditional sense of the word, deals quite strictly with the past, and with the Other, and it is in fact ourselves, in the present, which I wish to examine.

Both Schechner (Schechner 1985) and Conquergood (Conquergood 1992) make use of the term in their discussions of Performance, and are equally at pains to point out the temporal and focal differences in their approach. Traditional anthropology, like archaeology, allies itself with the scientific, rather than the cultural. As Schechner puts it: "In the past anthropologists have fancied themselves siblings of 'hard scientists.' but hard science works from models strictly fenced off from ordinary life" (Schechner 1985:109) – a point made in great detail by Latour, who goes further: "For traditional anthropologists, there is not – there cannot be, there should not be – an anthropology of the modern world." (Latour 1993:7)

In essence, the above temporal and focal difference dislodges anthropology from its location as a Modern Western academic discipline studying non-Western cultures, and refocuses its lens back onto Modern Western culture itself. This flies in the face of the practices of most traditional anthropologists and ethnographers because it is actually precisely because "they remain incapable of studying themselves in this way that ethnographers are so critical, and so distant, when they go off to the tropics to study others." (Latour 1993:7) As Conquergood describes, there has been a "romantic fascination" with "primitive ritual" amongst Western theatre practitioners, which has resulted in the appropriation of "premodern and non-Western performances as sources of inspiration or revitalisation for bourgeois theatre," a trend which "resembles the imperialist practice of 'discovering' natural resources in the colonies and shipping them back to the capital as raw materials for processing and manufacture." (Conquergood 1992:43)
Now this is not to imply that all anthropologists and ethnographers are by definition colonialists, nor even to criticise the anthropological tradition per se, but merely to distance the present quasi-‘anthropological’ approach from such a pitfall, and—most importantly—to reveal the paradox that seems to be apparent at the core of traditional anthropological practice: that the “seamless fabric” of what Latour calls “nature-culture” is something which even “the most rationalist ethnographer is perfectly capable” of elucidating, “bringing together in a single monograph the myths, ethnosciences, genealogies, political forms, techniques, religions, epics and rites of the people she is studying,” when those people are NOT ourselves, but that this “is impossible to do with our culture.” (my emphasis). This, in Latour’s words, is “because we are modern. Our fabric is no longer seamless.”(Latour 1993:7)

Anthropology, then, in the sense in which both Schechner and Conquergood use it, and in the sense in which I propose to use it, is an attempt to step outside of Western society and view it as a totality, to step beyond the boundary divisions that demarcate the disciplines of modern thought and attempt to see our culture as an inter-related whole, with a seamless fabric, in the way that real anthropologists do with other societies and cultures, yet find so impossible to do with our own. It is an attempt to go beyond a critical appraisal of this or that aspect of our culture, in order to grasp a snapshot of the whole, and in critically appraising that whole, find aspects of our culture that are of particularly crucial importance.

The divisions in modern western culture that Latour picks out as fundamental to the nature of Modernity— the reason why traditional anthropologists and ethnographers cannot discern a “seamless fabric” in our own culture and bring its many elements together in one monograph—are evident everywhere that one looks. These divisions are often not only obvious but consciously and openly deliberate. To take a particularly topical example, the separation of church and state and the unity of mosque and state is an argument at the heart of the current problems in Western-Islamic relations. Ironically, the mediaeval unity of church and monarchy could be said to have fostered
the democratic institutions which today guarantee religious freedom in the West – as we shall see in more detail in a moment - and the sultanate's secular rule which guaranteed religious freedom in the mediaeval Arab world could be said to have starved the Islamic world of the impetus to develop such democratic institutions. Today's fundamentalist Islamic call for religious rule in society, seen from the traditional anthropological perspective, seems backward, primitive – politicians in Europe have indeed said as much – yet but cast that anthropological eye back upon the society that creates it, and join up the separate worlds of politics and religion in the Western world, and the links are immediately everywhere apparent, from the open support for the religious right given by George W Bush to the 'established' nature of the church in the UK. How can a Western world ruled by leaders with deeply Christian values claim the Modernist high-ground of a separation of church and state, unless the divisions in our society are so foundational that the traditional critical eye is simply not able to see them?

This crucial question of the foundational divisions within Western society is what Latour seeks to illuminate in his seminal text, "We Have Never Been Modern." (Latour 1993) and is a subject we will return to when examining Cultural Performance. For the present, it is necessary to examine more closely the most fundamental division in Modern Western culture picked out by Latour – that between people and things. It is this division which feeds the fracture between the linear and holistic where the cyborg is located.

II) The Birth of Modernism

Continuing our 'anthropological' examination of Western culture, we must look, with Latour, to the roots of the Modern. Examining the performance of actors on the political stage, we must focus, in this section, upon the intellectual and political origins of the linear, rationalist understanding of the world – the approach of 'hard science' which anthropologists wish to emulate. We will find, as with our initial discussion of anthropologists themselves, that the issue of separation versus unity is very much at stake.
At the roots of the Modern, in the 17th century, the 'British Wars' took place – more popularly known as the English Civil War. Using standard historical sources, (Winkleman 1986) and the more recent work of Simon Schama, (Schama 2001) we shall now take a brief look at this period from a 'Kings and battles' perspective, as if first to examine the decorative and even glamorous nature of the veil we will then endeavour to see past.

Almost as light relief, amongst the more philosophical concerns of the thesis, Simon Schama’s (Schama 2001) history of this period makes often amusing reading, albeit somewhat contentious. I have included some of this history in the narrative of the thesis as counterbalance to the airier notions of historical change offered by Foucault and Latour. Although, like Foucault, Schama has little to say about the objects in history, juxtaposed with Latour’s and others’ record of the very material/physical laurel crowned coins of James I/VI and the roman columned buildings that sprung up during and after his reign, and the arrival and impact of the printing press and other technological innovations of the era, Schama’s story makes the rather weightless, ephemeral nature of epistemic shifts and seamless webs somehow more grounded, and our the narrative gains some colourful personalities beyond the philosophers and scientists and their theories. Schama’s TV history acts as an anchor lest the thesis float too far from the everyday. Again, the seamless web unites all things.

The British Wars, then, for Schama, are perhaps better understood as the British theatre of a European War, the wars of religion that flowed from the Reformation and Counter-Reformation. ‘Heresy’ almost completely wiped out by 1500, the Roman Catholic Church had become complacent and corrupt. Religious revolution began with Martin Luther (1483-1546) and continued with John Calvin, whose ideas took hold in Geneva in 1541, and swept through France and the Netherlands. In Germany, Lutheran states converted to Calvinism, and in Scotland a completely reformed, Calvinist, ‘Presbyterian’
church was established by Act of Parliament in Edinburgh in 1560. "By 1570 out of every ten subjects of the Holy Roman Emperor seven were Protestants."(Winkleman 1986) But the Counter-Reformation soon gathered pace, and the Protestant 'share' of the European continent fell from 40 to 20% between 1570 and 1650.

In England, the break with Rome in 1534, (and the legal union with, or absorption of Wales) under Henry VIII, and the dissolution of the abbeys and monasteries – many of which were to become the houses of a new landed gentry - had been a largely self-serving affair, and it had taken the persistence of Bishop Thomas Cranmer – who had drawn up the divorce papers for Henry – and the seemingly genuine support of Henry's short-lived son, Edward VI, to push through the truly radical reforms of the new Church of England (and Wales) that would make it a real Protestant church, albeit still with many Catholic undertones (Schama 2001). Edward's sister, Mary, promptly reversed most of these reforms, and made Cranmer into a Protestant martyr by burning him at the stake. It took the steel will of her sister, Henry's third offspring to ascend the throne, Elizabeth I, to reinstate the English Reformation and bring about a balanced Protestant England (and Wales), in what, despite appearances, was, by comparison with her forebears and descendants, a stable, peaceful reign. Even in the face of the Spanish Armada in 1588, bent on returning the kingdom to the Catholic fold, the excommunicated Queen Bess and her Protestant England held firm. Heirless, however, it fell to James VI of Presbyterian Scotland to succeed her, becoming James I of England (and Wales) too. As he processed south through the country, in 1603, he was already inventing the history and traditions of a Britain that had only existed before then in Arthurian legend. A new Caesar, taking after the famed Christian Emperor Constantine whom legend had it had come from North Britain, James wore the laurel wreath crown on his new British coins, and in time bequeathed to his son Charles I a supremacist ideology, already taking hold in Europe, that would be his undoing. Charles, like his father, was a Caesar, King of England, Wales, Scotland and Ireland, and clung to his divinely appointed right to rule to the bitter end.(Schama 2001)
This fascination with the old Roman Empire, with Constantine, and all the trappings of Roman culture, prompted a revolution in many walks of British life. Architecturally, the British love of columns and colonnades can be traced to this time, as can the origins of the British version of the Roman Empire, the new Empire upon which the sun would never set. We shall see later in this thesis much more of how this all unfolded.

Charles I's attempt to bring the English and Scottish churches into line prompted what might be regarded as the first shots in the British Wars, in the summer of 1637, when the Presbyterian worshippers in St Giles's Cathedral in Edinburgh threw their footstools at the Bishop in protest at what they regarded as the 'Popish' new prayer book - among the earliest ever printed, on the new printing presses - Charles and his Archbishop William Laud were trying to force upon them. (Schama 2001:86) Interestingly enough, William Prynne's prolific pamphlet writing against Laud's ideas brought about the prosecution of his printer! (LambethPalaceLibrary) Indeed it was the Catholicism, both perceived and real, of Charles I, (and later his sons Charles II and James II,) that set parliament against monarch, and brought Tories as well as Whigs into conflict with the king, during the half-century that followed the Laudian reforms. People's memories of Bloody Mary and her brutal persecutions of Protestants in the previous century were still fresh, and the threat upon the Continent at the hands of Emperor Ferdinand II and Louis XIII and XIV of France all too present. Perhaps, too, in Parliament, there was a sense in which the new Roman Republic of Britain could do without a Caesar at its head.

The Civil War that finally brought Charles I to the chopping block in 1649 saw a revolution in many respects, but, in truth, the Protectorate of Oliver Cromwell was no great revolution in Sovereignty. The years between 1637 and 1649 were turbulent and disturbing years for Lord and commoner, Scotsman, Irishman, Welshman and Englishman alike. Puritanism - a kind of catch-all term for the more radical Protestants, many of them Calvinists, Presbyterians, and the like - was a vibrant and growing sub-culture the length and breadth of England, and in all walks of life - and, keen to escape Archbishop
Laud's oppression, busy establishing settlements in the New World, too. Busy, in fact, deliberating on ways to govern those new settlements, and, ultimately, on how a new Jerusalem might come to being in England itself. (Schama 2001:102) Covenanters and Levellers especially - vocal minorities among the Puritans - spoke of ridding the Anglican church of its 'Popish' episcopacy - the very structure of Bishops and Archbishops that James I had maintained and that his son, Charles I, was now trying to force upon the Scots. Many Puritans wished, in short, to complete what was increasingly being regarded as the 'unfinished business' of the incomplete English Reformation. The Long Parliament which began in November 1640 and remained in session, in one form or another, for the next nine years, began with the repeal of the church reforms Charles and Laud had tried to force on the Scots, and effectively ended absolute monarchy in Britain. (Schama 2001:110) But the ending of absolute monarchy, even the regicide that finally resulted from Charles's obstinate refusal to compromise, was not the outbreak of democracy, let alone a new Jerusalem. With the iron fist of the New Model Army behind him, Oliver Cromwell became heir to the throne in all but name and trappings, the Protectorate a new dynasty in all but doctrinal legitimacy. When Oliver died and his ineffectual son Richard ascended briefly to his place, the Restoration of 1660 was brought about not so much out of a desire for the return of monarchy but out of the dire need to find someone with the legitimacy to succeed Cromwell. Sovereignty, the hand of might that guaranteed the commonwealth, survived the Civil War little altered. (Schama 2001)

Perhaps in a sense, however, these years saw the first information revolution. Gutenberg's printing press of 1454 made the Bible more widely available than ever before, and this can only have fostered the Protestant revolution that followed less than half a century later. English translations of the Bible began rolling off the printing presses during Henry VIII's time - John Roger's translation of 1537 earning him a place at the stake during Mary's terror. It was, of course, the wide availability of the Bible in English, instead of in Latin - the famous and most widely distributed 'Authorised Version' published by the new King of Great Britain, James I, in 1611 - that helped to spread the
Protestant fervour among the common people of the British Isles, and no doubt contributed to the dissemination of Covenant and Leveller ideas. Though James had refused to abolish the episcopacy as early as 1603, his publication of the Bible in English for every Church in the land was a victory for the Puritan cause. During the constitutional unrest of the 1640s the new printing presses of London and Edinburgh were kept busy day and night churning out posters and handbills, pamphlets, and newspapers, feeding the hunger of the increasingly literate populace for news about the great debates in the land.

The whole European scene, in fact, was experiencing a radical turnaround. The old established north-south trade routes from the early commercial strongholds of Holland to the city-states of northern Italy were turning through 90 degrees. Henry and Elisabeth’s seafaring endeavours had spawned a strong English fleet both naval and maritime, and it was perhaps as much this sea-trading affinity as religious common cause with the Dutch that saw a new trading axis across Europe from Britain and the Netherlands in the West across to the (Lutheran) German principalities in the East. Long before any new technologies arose to fuel this trade the movement of populations displaced by the religious wars into the cities had sparked an industrial revolution based on cheap mass labour. "In 1500 only four cities - Paris, Milan, Naples and Venice - had more than 100,000 inhabitants. By 1700 this number had trebled, and London, Paris and Constantinople had passed the half-million mark.”(Winkleman 1986:180)

France, meanwhile, under Louis XIV, was soon threatening a complete dominance in Europe that had even the Holy Roman Emperor and the Papacy worried, let alone the Protestant Dutch Republic, to its north. The Huguenots – numbering less than half the Protestants France had boasted at the start of the century - were expelled from France in 1685 – the same year that James II came to the throne, and Louis’ armies harassed the Dutch - and it was Louis’ money that paid for the standing armies of both Charles II and his brother James. It was clear that Louis’ Europe was to be an exclusively Catholic one, with no toleration or indulgence of the new Protestant creeds,
and the Nine Years War that engulfed the region from 1689-1697 was as much about religion as it was about French ascendancy.

But Louis was perhaps the greatest patron of the arts and sciences Europe had known in centuries, and set the standard for patronage for the next two hundred years. The intellectual, academic, administrative and cultural life of the whole of Europe was undoubtedly and markedly furthered by the pensions he paid both within and beyond his realm, to the poets, writers, artists and artisans many of whom are today regarded as the founders of the modern world.

The philosopher Thomas Hobbes was one such beneficiary of Louis' generosity – albeit not directly. Born in 1588 – he once claimed that he had been born prematurely, "as a result of his mother taking fright at the prospect of the Spanish Armada."(Schama 2001:176) – Hobbes lived off the Earls of Devonshire for much of his early life, and after failing to get elected to parliament in 1640 took himself off to Paris to live the intellectual life by the banks of the Seine, debating with other philosophers on the nature of the vacuum - a hot topic at the time - and write his famous work on the problems of sovereignty, The Leviathan. But Hobbes was neither a religious man nor a royalist. Hobbes was a rationalist, and declared "'feare of power invisible... imagined tales publiquely allowed' ... was the source of most if not all religious experience. Pious fictions – like miracles, revelations or the existence of the soul itself – which could neither be proved nor disproved, might be a consolation for the anxious, but they were of no use in helping men escape the pitiless war of all against all, which was their lot in a state of nature. The only true asylum from anarchy lay in the surrender of liberty to an omnipresent sovereign – the Leviathan – in whom all individuals would be subsumed."(Schama 2001:176)

Hobbes returned to England in 1651 – the year of Leviathan's publication – his colours seemingly firmly nailed to the mast. As it turned out, he was not the atheist many deemed him to be. For Hobbes, God was absolutely necessary to keep the
Leviathan honest. His post-Restoration history of the Civil War, Behemoth (1679) unequivocally condemns the regicide of Cromwell and his Council of State. But in Cromwell's England, such moral issues were irrelevant. Authority was needed, and Cromwell provided it, and that was all that mattered. Hard-headed, unflinching logic should be the only deciding factor in politics and government, as far as Hobbes was concerned, and religion should be set aside, banished to metaphysical speculation where it belonged. "Reason demanded submission to whatever sovereign had the capacity of providing peace and law."(Schama 2001:194)

Perhaps it was these sentiments, as the Restoration of the monarchy in 1660 proved only to have muddied the waters, and with both of the murdered King's sons turning out to be Catholics in the pay of Louis XIV, that prompted parliament – both Whig and Tory – to countenance, on the hundredth anniversary of Queen Bess's victory against the Spanish Armada, inviting William, Prince of Orange, to invade and conquer the British Isles. For that, in effect, was what happened, for all that it was carefully dressed up as a succession. James II, as foolish as his father, held out to the end for the supremacist ideal, and ran eventually to the sanctuary of Paris, with wife and newborn son, while his two daughters, Mary married to Prince William, and the younger Anne also defected to the Protestant cause, ended up on the throne instead. The Glorious Revolution of 1688, as it is known, included, however, of course, one very special deal. In exchange for the Crown, now, (and with his troops on the streets of London William was not about to settle for anything less,) the Dutchman conceded a permanent commitment to the reforms of the Long Parliament and the Protectorate as a condition of the Crown's authority: "No more standing armies; no dispensing power; no resort to extra-parliamentary taxation; no resurrection of special courts and tribunals, ecclesiastical or civil; freedom to petition guaranteed; free elections; annual parliaments."(Schama 2001:321)

The vacuum of sovereignty was filled – not, however, with the massive authority of a Hobbesian Leviathan – but more with what might best be described as a "Chairman
of the Board." (Schama 2001:322) In the space of little more than a hundred and fifty years, from Henry VIII to William I, England had absorbed Wales and Scotland to become Great Britain, broken away from the Roman Catholic Church and established itself as the leading (and unassailable) Protestant State in Europe, and rid itself of absolutism in favour of a constitutional monarch, shifting sovereignty to its elected Parliament. The engines of this change had been a mixture of the impact of the Europe-wide religious revolution, the population movements brought about by religious and civil wars, the invention of the printing press and the concomitant huge increase in literacy, and the new sense of self of the newly created British people as somehow inheriting the mantle of the ancient Roman Empire. This last perhaps most clearly represented by the laurel-crowned head of James I on the coins in everyone's pockets, and the sudden rash of new Roman-style columned buildings that sprung up in the centres of Britain's rapidly expanding cities - most famously Christopher Wren's St Paul's. Most tellingly of all, Schama's image of the new constitutional monarch as 'Chairman of the Board', finally, sums up that other most crucial aspect of what it meant to be a Protestant state: government support for commerce. As Weber pointed out so well, and as we shall detail later in this thesis, Calvinism, the creed of the Presbyterians, of Scotland, and of James I and William I, lay at the heart of the birth of modern Capitalism (Weber 1992).

(B) "The New Constitution"

To follow this colourful narrative summary of Schama's historical backdrop to the birth of modernism, it is now necessary to outline Latour's rather more analytical view of the socio-political settlement of 1688 - which he dubs the "New Constitution" - as laid out in his book, "We Have Never Been Modern" (Latour 1993). In this section, then, we shall examine - and broadly agree with - the gist of what Latour puts forward.

Latour begins with an examination of Shapin and Shaffer's tracing of the history of the debates around the nature of the vacuum that raged between Hobbes and Boyle. In Latour's view, they "come to grips with the very basis of political philosophy....[by
examining] how Boyle and Hobbes fought to invent a science, a context, and a
demarcation between the two." (Latour 1993:16)

In brief, Boyle is shown to be the originator of empirical science, casting off the
traditional approach of grounding one’s work in logic, mathematics and rhetoric, (and
ridding Nature of any divine presence,) and instead inventing an entirely new scientific
philosophy, in which the mute objects of a Nature that has always already been there
would reveal to the enquirer their secrets in the confines of entirely artificial and
controlled environments - the laboratory - through experiments that would deliver up
wholly fabricated facts. These facts would be attested to by "credible, trustworthy, well-
to-do witnesses." This is the foundation not only of empirical science, but of one the
primary tenets of the modern world: this is the foundation of the rationalist, linear
approach and understanding of the world. (Latour 1993:30)

Hobbes, as we have seen, faced with the impossibility of the old medieval loyalty
to God and King – which had died with Henry VIII, a century before - in a new Protestant
world where all people (the Levellers and the Covenanters in particular) can petition God
directly, devised a generalised constructivism to end the civil war, which amounts to: "no
transcendence whatsoever, no recourse to God, or to active matter, or to Power by
Divine Right, or even to mathematical Ideas." (Latour 1993:16)

Boyle’s empirical style is, of course, at odds with Hobbes, for it rests upon "the
right to have an independent opinion, in a closed space, the laboratory, over which the
State has no control." Hard science works, as we saw earlier, from models strictly fenced
off from ordinary life. Those who challenged the King’s authority “in the name of their
personal interpretation of God” are replaced by a group of scholars “who are going to
start challenging everyone’s authority in the name of Nature by invoking wholly
fabricated laboratory events!” (Latour 1993:20) This is to separate Knowledge and
Power, which for the monistic Hobbes is the very source of civil war. The "lovely order
that Hobbes is trying to recover is annihilated by the multiplication of private spaces
where the transcendental origin of facts is proclaimed – facts that have been fabricated by man yet are no one's handiwork, facts that have no causality yet can be explained. How can a society be made to hold together peacefully, Hobbes asks indignantly, on the pathetic foundation of matters of fact?" (Latour 1993:22) The battles of the two at the time were legendary.

But in Latour's reading the two thinkers were presenting complementary strands of a new system of government, which with the Glorious Revolution was about to take hold of England, and thereafter, through the Empire it spawned, the world. The two were engaged in the construction of what Latour describes as the primary dichotomy at the foundation of modernism, the divide between non-human nature and human culture - a foundational distinction between Nature, on the one hand, and the testimony of non-humans in experimental conditions that constitute evidence and matters of fact, and, on the other hand, Power, and the secular unity of the represented citizen in his contract with the sovereign. The division, in short, between things and people.

Politics and Science are – by mutual agreement – here held apart. Boyle creates "a political discourse from which politics is to be excluded, while Hobbes is imagining a scientific politics from which experimental science has to be excluded. In other words, they are inventing our modern world, a world in which the representation of things through the intermediary of the laboratory is forever dissociated from the representation of citizens through the intermediary of the social contract." (Latour 1993:27)

Crucially, the separation between these two must be maintained if they are to retain their individual validity. "Hobbes's State is impotent without science and technology, but Hobbes speaks only of the representation of naked citizens [and] Boyle's science is impotent without a precise delimitation of the religious, political and scientific spheres" - hence his attack on Hobbes's monism. "The representation of non-humans belongs to science, but science is not allowed to appeal to politics; the representation of
citizens belongs to politics, but politics is not allowed to have any relation to the nonhumans produced and mobilized by science and technology." (Latour 1993:27)

The performance aspect of this representational political philosophy is striking: Hobbes' Sovereign is the spokesperson of the citizenry: when he speaks, it is they who speak through him. Likewise Boyle's community of witnesses, the new scientists, are but scrupulous representatives of the facts: it is not they themselves who speak, rather, the facts speak for themselves: "Little groups of gentlemen take testimony from natural forces, and they testify to each other that they are not betraying but translating the silent behaviour of objects." (Latour 1993:29) Representation, indeed, is all too easily interpreted, in this context, as performative. 'Little groups of gentlemen' enact scientific fact into being, within the confines of their carefully constructed theatre-laboratory, and the characters of their play – the 'facts' – begin to speak for themselves. All too soon the scientists' mediation will become all but invisible. Representation "will take on two different meanings, according to whether elected agents or things are at stake."

Yet the power of things, of the nonhumans whose silent voices are translated to us by the new science, is set to overtake, to dwarf the power of the representatives of the people, in their newly sovereign Parliament. For it is the mercantile classes – the abstemious, frugal, hard-working Puritans - whose industriousness in the manipulation of objects using the secrets revealed by the new science, and whose tendency to accumulate capital rather than spend it on un-Godly luxuries, is rebalancing the distribution of wealth. It is the bourgeoisie, as they will later be called, who have increasingly become those very representatives in Parliament – the MPs who have curbed the powers of the monarch, no less, beheading one, and then exiling the other by inviting a more favourable rival to invade and conquer the country, on condition that he let Parliament share sovereignty over the land. The State created by the Glorious Revolution, of course, from the outset, is entirely dependent upon the power of science and technology to mobilize "the countless goods and objects that give it consistency and durability." (Latour 1993:30) Thus, for all the claims of the Leviathan, that it is "human
beings, and only human beings, [who] are the ones who construct society and freely determine their own destiny," it is quite clearly the objects created by the new science which gives such a society substance, which makes it last. Similarly, if Nature is something "always already there," not made by or for human beings, the 'mater' the Christian God declared was Man's to dominate becomes suddenly remote, hostile, transcendent. The Laws of Nature ultimately escape Man's grasp – yet may be fabricated in the laboratory! Nature then may be constructed artificially and at the same time discovered.

The moderns have it sown up: "They are going to be able to make Nature intervene at every point in the fabrication of their societies while they go right on attributing to Nature its radical transcendence; they are going to be able to become the only actors in their own political destiny, while they go right on making their society hold together by mobilizing Nature." (Latour 1993:32)

But there is a problem here, in the midst of these paradoxes of Nature and Society: the paradoxes are reversible. "The exclusive transcendence of a Nature that is not our doing, and the exclusive immanence of a Society that we create through and through," can be turned upside down, for, "In spite of its transcendence, Nature remains mobilisable, humanisable, socialisable. Every day laboratories, collections, centres of calculation and of profit, research bureaus and scientific institutions blend it with the multiple destinations of social groups. Conversely, even though we construct Society through and through, it lasts, surpasses us, it dominates us, it has its own laws, it is as transcendent as Nature." (Latour 1993:37) As the Native Americans said of us, when we arrived in their country, the White Man speaks with forked tongue. The moderns have a double language, which appears to make them invincible.

The result of this doubling reversibility of the foundational paradoxes of Modernism is the proliferation of hybrids: denizens of the seamless fabric of nature-culture that we allow in our anthropological studies of so-called 'primitive' societies,
(including the pre-moderns) but which we, as moderns, pretend do not exist in our so-called 'civilised' world. The networks that permeate this seamless fabric, linking "the most distant sky and some factory in the Lyon suburbs, dangers on a global scale and the impending local elections or the next board meeting" are "simultaneously real, like nature, narrated, like discourse, and collective, like society." (Latour 1993:6) In short, for all the pretended demarcation between Nature and Culture they are self-evidently everywhere intertwined - and all the more virulently so for the apparent non-existence of such relations in the carefully demarcated scheme of the modern world. Right at the very fracture between people and things set up by the Modern constitution of Boyle and Hobbes, sits the Hybrid: the Cyborg.

The "new constitution" meanwhile suddenly looks like a complex con-trick, a sleight of hand used to keep our eyes on the ball and off each other. This whole pretended demarcation of Nature and Culture – the very stuff of Modernity – is revealed for the elaborate collective "as if" that it truly is. As Latour summarises: "we have never been modern.....No one has ever been modern. Modernity has never begun. There has never been a modern world." (Latour 1993:46-47) Modernity, in short, tried to carve out not only an intellectual space, but a place in time, which we now inhabit, a sort of eternal present, "outlined by a series of radical breaks, revolutions, which constitute so many irreversible ratchets that prevent us from ever going backward." (Latour 1993:71-72) Scientific Time/History effaced the history of things. Since Boyle, things are 'discovered,' they 'appear' in history but have no past. Things and people live on different timelines, and history flows from a confused past to a future where things and people are distinct. Or, perhaps, a future where things and people are rejoined in new and perhaps sinister ways.

Indeed, if one does gather all the elements of a particular time into a totality it becomes a phalanx marching into the future. But when one recognizes that in truth any particular time includes elements from many different periods, ontologies, and genres, then this myth of the phalanx breaks down. Any historical period, in fact, when looked at
with this perspective, will reveal "a great hotchpotch" of different times. Further, "everything that does not march in step with progress" is not "archaic, irrational, or conservative." (Latour 1993:73) Examples are multiple: Postmodern architecture, with its recontextualisation of classical tropes in modernist concrete formulations, for one. The Islamic revolution/reaction and its underlying threat to our belief in our modernity, for another. Many successful industrialists and digital economy millionaires live in converted mediaeval barns. Hayles’s skeuomorphs - quasi-anachronisms like plastic-moulded stitching on PVC 'leather' jackets - are everywhere to be seen (Hayles 1999). Next to the mid-20th century electric drill in the handyman's toolbox lies a hammer - a tool with hundreds of thousands of year's worth of pedigree. In short, "every contemporary assembly is polytemporal." (Latour 1993:74) Latour suggests that the linear time of the moderns is thus better reconceived as something "spiral" in nature. He suggests we are exchangers, or brewers of time. "It is this exchange which defines us, not the calendar or the flow that the moderns constructed for us." (Latour 1993:75) For Latour, we have never moved either forward or backward in time; we have always been sorting out, bringing to the fore and sidelining, exchanging and rearranging elements belonging to different times. "We can still sort. It is the sorting that makes the times, not the times that make the sorting." (Latour 1993:76)

So much, then, for the roots of the Modern. The unity of the Catholic world, the great chain of being that held it all together, was broken, and the Protestant lands – Britain, Holland, and the central and eastern German principalities - were ready to underpin their new religious affinity with trade agreements, and to rewrite the trading map of Europe. But the clearly demarcated realms of politics, science and religion set up in place of the Catholic hierarchy, separations which depended upon the collective "as if" of Modernity that these new states subscribed to, nonetheless promoted a rapid proliferation of hybrids between those demarcated worlds of Nature/Things and Culture/People. In the new capitalist economies of the Protestant states, things and
people began rapidly to be ever more intricately intertwined, in inverse proportion to the separation Modernity tried to establish between them.

The argument between the rationalist, scientific, Protestant capitalists and their Catholic, universalist, inclusive neighbours was set to continue.
ii. Rationality vs. Holism

In this second part of this section we will now contrast rationality and holism. This will be done in four sections. Firstly through use of an original interview with a respected neuroscientist, Richard Norman, we will offset his ideas with those of one his rivals, Susan Greenfield, and through the critique of artificial intelligence offered by Dreyfus. Secondly through a series of examples based upon the interview material gained from the three performers, Stelarc, Kac and Ju90, we shall see how the rationalist approach often fails to achieve its aims. Thirdly, through an examination of Wiener's cybernetics as critiqued by Hayles, we shall see that the most recent re-invention of the rationalist approach compounds the problems inherent in its origins, and finally we will briefly re-introduce the ideas of a philosopher whose work has fallen out of favour: Henri Bergson.

In our discussion of Performance from an anthropological perspective, in an attempt to locate the Cyborg at the fracture of the rational and the holistic, we have seen how anthropology itself must be reinterpreted as an approach in order for it to look back upon the society that spawned it. In looking back upon Western culture with such an anthropological eye, we have, with Latour, looked back to the roots of Modernity, and discovered the origins of the linear in a false separation between Nature/Things and Culture/People, a separation that has spawned innumerable hybrids in the non-space of their denial. We have found that the linear is spawned in the theatre-laboratory fenced off from ordinary life, where ‘facts’ are fabricated by “credible, worthy, well-to-do witnesses” who are either closely connected with or the self-same individuals who move the goods and technological produce of this new science around in this new society and provide it with the glue and substance which holds it together.

But to see the heterogeneous networks which actually unite people and things in our societies, one requires a mode of thinking that grasps the whole as well as the component parts of the picture; one requires a holistic perspective. In this second part
of this section of the first chapter, then, we will continue to examine the linear, rationalist approach of Boyle's new empirical science, but look at it as it appears in the present day, and we will contrast it with those whose voices have more recently been heard whose perspective carries much more of an appreciation of the whole, the voices of those for whom matters of culture, consciousness, and humanity, are not completely divorced from, and irrelevant to, the study of matter.

I) Norman vs. Greenfield: The Brain

During the course of the research for this thesis, the author was able to undertake an interview with Professor Richard Norman, a scientist in Salt Lake City, Utah, who makes implants. The implant that Prof Norman makes is a neuro-prosthetic – the Utah Array, as it is known. This device is based on Norman's micro-electrode technology – a silicon-based invasive technology that, during brain surgery, is implanted into neural tissue to record the electrical responses of neurons to various stimuli. The Utah Array, a leader in this field, contains no less than 100 microelectrodes, which penetrate into the brain.

As is evident from the interview transcript, for Prof Norman the linear, rational world presented to him by strictly measurable science, is all the world that there is. No sense here that the non-rational holds any meaning or significance, no room, essentially, for anything to display "global properties not possessed by its individual components." (DeLanda 1991:20) No sense of the holistic, or as Prof. Greenfield puts it, that "no single area of the brain is activated exclusively and solely during a specific mental task. On the contrary, whole constellations of brain regions become active at different times and in subtly different configurations..." (Greenfield 2000:25) For Norman, the brain is a "parallel processor of sensory and motor information." (Norman)

Consciousness, the will, selfhood – the Hobbesian world of the citizen, in other words - all these have been very successfully set aside from the scientifically observable
universe. In the quasi-juridical model of experimental science set up by Boyle (Latour 1993), indeed, it is the power of witness, the witness of worthy gentlemen scientists whose opinion carries epistemic power (Foucault 1995), which constitutes fact. Thus human consciousness - as witness - must by definition exist outside of fact, because fact exists as something known. Consciousness is, indeed, something by definition immeasurable, and thereby, for believers, somehow transferable, a collection of information sufficiently divorced from matter that it can travel unimpeded from one material housing to another, unaffected. This is the stuff of the wilder end of cyberpunk fiction, displayed by a neuro-prosthetician. Norman tells how in his "graduate years" he was really interest in "the cyborg sort of revolution" but felt that rehabilitation might be the wrong way to go.

Prof. Norman: I mean the idea of implanting systems in people to make them more mobile (paraplegics, tetraplegics) - it seemed like it was not going to be necessarily the best way to go. A more fruitful way to go - this could be something that could be down your line - would be not to instrument the body, so the body can move through space, but to instrument the 'id' that moves its way through the world and interacts with the outside world, and the tetraplegic could remain in bed, and interact through this sort of extension of himself.

This is effectively a kind of tele-presence, designed for tetraplegics. Norman admits most people are horrified at such an idea.

Prof. Norman: They don't believe that people can - their identity can be this remote system which is sort of driving around, and they think that the body is an important part of interaction and whatever.

This is precisely one of the foundational points made in this thesis – that the body is not just an important but as essential part of interaction. But Norman is not so sure that this is the case. He makes the point that people are very good at "sort of virtual bodies" and cites the common use of telephones as an example, as if the
telephone were not also commonly known to be much the poor cousin to meeting face to face.

It is quite clear where Prof Norman is coming from. But to press the point home, somewhat in the vein of a devil's advocate, during the course of the interview, I asked him directly about his take on all things "holistic." Here is his answer:-

Prof. Norman: I believe that we're deterministic, and er, we just don't know what the plan is, but we are deterministic. I don't believe that we have a soul. ... The brain and the neuro-chemistry associated with mood, influence things dramatically, but I don't think there's anything particularly magical about the body.

Norman needed to be pressed further on this question. It is after all a matter of scale. At the scale of individual bodies, in our hospitals and universities and so on, the medical model holds sway. At larger scales, however, incorporating whole environments, the holistic model of ecosystems is held to be a more accurate picture. In particular the study of the weather, an area of great concern in this age of global warming, has necessitated something of a rethink with regard to the more traditional reductive scientific model. The tenets of Chaos Theory hold sway in this field – a science originally confined to the subatomic scale, which has emerged as a key to understanding planetary behaviour. The behaviour of the weather, for example, is described as spontaneous patterns that emerge from randomness (Lovelock 1979). These patterns follow the basic model of all Chaos patterns – they reproduce themselves at different scales. The Mandelbrot and Julia Sets, are perhaps the best known examples of this phenomenon, each 'set' being a complex pattern that can be seen repeating itself over and over at whatever level of magnification (Marshall, Peat et al. 1997). Moreover, the weather is but one element of an integrated animal-vegetable-mineral-atmospheric planetary whole eloquently described by Lovelock in his book about the planet Earth, called "Gaia" (Lovelock 1979). Now, in this age of global warming, this picture of the planet holds enough scientific weight to have caused major policy changes in the industrialised
nations to protect the health of this holistic planetary ecosystem - much to the chagrin of
some corporations for whom the reductive, compartmentalised, modular model of the
environment allows easier and cheaper disposal of waste, for example.

So there is a disjunction here, between our conceptualisation at different scales.
On the subatomic/microcosmic scale, and on the planetary-macrocosmic scale, we deal
with wholes. On the scale of individual human bodies, we work with an older, rather
different, reductive scientific approach. Is this just an example of post-modern
pragmatism - fitting the right model to the right thing - or is there potentially some future
problem that might arise from this disjunction? I put this question to Norman, and he
responded with the following:-

Prof. Norman: I don't think that the term you're thinking of - I don't think of our
view of trying to help our global picture (- and we're not helping it very effectively, but our
attempts at that -) as being a holistic approach. I wouldn't call it a holistic approach. I'd call it
a sort of a 'stumble fumble' sort of approach; we're kind of trying to fix up wherever we
discover there are problems.

The Cassell paperback dictionary defines holism as "the tendency in nature to
evolve wholes that are more than the sum of the parts." (Cassell 1998) Lovelock - a
former NASA Space scientist involved with the study of Mars - turned his attention to our
own planet and came up with his now famous hypothesis that "the biosphere is a self-
regulating entity with the capacity to keep our planet healthy by controlling the chemical
and physical environment." (Lovelock 1979Preface :ix) He names this self-regulating
entity 'Gaia', and proposes that "the entire range of living matter on Earth, from whales
to viruses, and from oaks to algae, could be regarded as constituting a single living
entity, capable of manipulating the Earth's atmosphere to suit its overall needs and
endowed with faculties and powers far beyond those of its constituent parts." (Lovelock
1979:9) Now it may be true that the attempts we are making as a species to curtail the
damage we are doing to this planetary entity follow a piecemeal, 'stumble fumble'
approach, but surely the reasoning behind such actions comes from a holistic understanding – the planet viewed as a whole. It would seem that Prof. Norman dislikes the word holistic because it is used by those alternative medical practitioners who like to view the human body as a whole, and it is precisely this disjunction between the traditional medical model of the body as collection of components and the more holistic view of alternative approaches which this author was trying to address with him, and precisely this disjunction which Prof Norman refused to look at.

Lacking any appreciation of a holistic approach, then, Prof Norman’s views on the mind are unsurprising: “I believe that the mind is deterministic, it’s just we haven’t figured out how to do it yet.” This view matches the image he turns to to explain it. In mediaeval times the image would have been clockwork. Today it is the computer:

Prof. Norman: It’s a complicated system. My Macintosh computer or PC Computer seems to have a personality of its own when it gets into sort of bizarre states. You get a system with sufficient complexity it can manifest rather interesting behaviour - and in fact .. people have written programs that cause 'bugs' to move across the computer screen, and interact with other 'bugs' 

The Artificial Intelligence project of the 60’s, 70’s and 80’s has been heavily criticised over the last decade for being not dissimilar to Alchemy – a project doomed to failure because of foundational assumptions at variance with reality, (Dreyfus 1979) , but for Norman “these bugs manifest incredibly sophisticated behaviour. And you think wow. The algorithms that must be causing this to happen have got to be incredibly complicated, and in fact they’re incredibly simple just like two or three rules which are required...[to].. make what seem to be extremely sophisticated behaviours. So in fact the behaviours that we manifest” - may indeed boil down to very simple equations. The understanding of life that is displayed here, to the author, seems extremely simplistic. The complexity of human performances reduced to being equated with the behaviour of
pixels on a computer screen. It speaks of a poverty of imagination. To underline the point, Norman summarises:

**Prof. Norman:** What amazes me is we used to believe that we were special - you know, Humans are special, a unique form of animal life. Now I think that belief has fallen by the wayside. Quite properly. I don't believe we're special. I believe that we do have some unique features, we have hands and our language which makes us unique, but what amazes me is the capacity for lower life forms to manifest an incredible range of behaviours that's almost as rich as ours. You take a cat - a cat has a brain the size of a walnut, yet that cat manifests rage, anger, affection, curiosity, play, communication - all the sort of basic emotions that we experience. It just can't articulate them very effectively. But they're there. So, you know, our brain is probably 30-40 times the size of a cat's brain, but we're not much different. So I don't believe that we're something special, I think that the brain is just another organ.

Prof Norman is right to say that humans are not as special as we once deemed ourselves to be. Yet rather than, as clearly he and the scientific establishment in general does, bring the human down to the level of the mundane, material and animal world we used to dominate when we believed we were special, it is this author's opinion that we should realise how special the material and animal world actually is, alongside us. When Norman speaks of the richness of the cat's basic emotions, he pictures them as a series of chemical reactions: nothing more. By drawing the parallel with humans, he is saying the same thing – that our emotional lives are just so much chemistry. Despite appearing to bring the cat up to our level, he is bringing the human down to the level at which the cat has been placed by reductive scientific methodology. On the contrary, this author would argue, consciousness is something very special, and pervades everything, as well as residing in ourselves. Reductive scientific methodology – as we have seen – must efface consciousness, and has no answer to the questions that it raises, and thus – quite logically – sees humans and animals as no more than collections of chemical reactions. But the new sciences in particular lead one to realise how inextricably interlinked and co-
dependent the human, animal, mineral, aqueous and atmospheric worlds are in the living, Gaian whole that is our cyborg planet.

Consciousness, indeed – as we shall see in more detail in later chapters of this thesis – is of crucial importance in this argument, both with regard to scale, and with regard to the disjunction between reductive and holistic approaches. The holistic approach is a particular skill of consciousness that has been sidelined by the reductive rationality of modern science. What Dreyfus describes as “holistic discrimination and association” is, in essence, “an ability to intuitively respond to patterns without decomposing them into component features.” (Dreyfus 1986:28). Absolutely not the reductive approach, in other words. Moreover, in his book championing “Mind Over Machine”, Dreyfus states categorically that “Intuition or know-how, as we understand it, is neither wild guessing nor supernatural inspiration, but the sort of ability we all use all the time as we go about our everyday tasks” (Dreyfus 1986:29). This capacity to intuit, to grasp things holistically, is a skill which has been acknowledged in our society “only in women, usually in interpersonal relations,” and been “adjudged inferior to masculine rationality” (Dreyfus 1986:29).

Prof Norman’s approach, indeed, is at odds not merely with this understanding of consciousness, but with that of other highly respected professors of neuro-science, for example Prof Susan Greenfield. Specifically, when discussing the place of emotion in the brain, she says, “If emotions are with us all the time, ebbing and flowing and meshing with more logical thought processes, then we cannot expect to ascribe them to a confined corner of the brain. Rather, we should try to discover some kind of holistic, net state of the brain that also varies from one moment to the next and correlates to different levels and types of emotion.” (Greenfield 2000:121) Again, in her discussion of the effects of hallucinogenic drugs upon the brain, she describes hallucinations as being “not due to a single neurotransmitter or to a single brain region, but rather to a transient, holistic brain state, some kind of global neuron configuration that can be induced, it appears, by tinkering with the serotonin system.” (Greenfield 2000:128) Indeed,
Greenfield suggests that trying to “explain sophisticated states of mind exclusively in terms of mere molecules” (Greenfield 2000:137) is itself the culprit in the problems many neuroscientists have in grasping what the brain is doing. “Of course, transmitters are vital to the rich range of emotions we experience,” she says, “but they do not have a particular emotion trapped inside them! Instead, brain chemicals, and hence drugs, work in the context of different brain regions, which, in turn, make up the complete brain. The net state of feeling is a product of this holistic brain, involving the coordinated activity of many brain regions.....So, in order to understand the true sophistication of the human brain, we need to search for features that are beyond the nuts-and-bolts level of chemical mechanisms. We need to take a look at the human brain in its entirety.” (Greenfield 2000:137)

This is not merely ‘woman’s intuition’ at work, contradicting a man’s more rational understanding of the field of neuroscience. As Dreyfus points out in his discussion of the processes of skill acquisition, there is much more to intelligence than “calculative rationality”. He distinguishes rationality and irrationality as opposite poles with a “vast area...between [them] that might be called arational” (Dreyfus 1986:36). On his scale of steps between novice and expert Dreyfus classes rational behaviour as “competent performance” - stage three of five. Proficiency – stage four - he describes as a transitional state, and experts, finally, he declares, “act arationally” (Dreyfus 1986:36) On Dreyfus’ scale, Greenfield is not only approaching the field in a different way to Norman, but also with a higher level of skill.

Important to note here, is that Manfred E. Clynes and Nathan S. Kline, who first coined the term, ‘Cyborg,’ were reductive scientists in the vein of Norman and Boyle. They thought of cyborgs as “self-regulating man-machine systems,” (Kline 1960:XV) and created the world's first being to be called "cyborg" at New York's Rockland State Hospital in the late 1950s. The world's first 'cyborg' was a white laboratory rat with a tiny osmotic pump implanted in its body that injected chemicals at a controlled rate to alter its physiological parameters. Like Norman's cat with the Utah array plugged into its
brain, this small white rat was— to these scientists— nothing more complex than a
collection of organic components processing chemical reactions, to which they had added
a non-organic component of their own, which could then take part in the chemical
processing. From the rational perspective, this is all well and good. From a holistic
perspective, it begs many questions that are simply not being addressed by those who
engage in these practices.

Greenfield stresses, “we should not concentrate on single cells or single lobes in
our quest to understand the brain. We are more likely to find answers by taking a
holistic approach.” (Greenfield 2000:153) Indeed, as she says, “when it comes to
consciousness and brain function, the whole is clearly more than the sum of the parts.”
(Greenfield 2000:173) Nor is the brain merely another organ of the body. As she says,
“Many neuroscientists conveniently forget that the brain is integrated into a body. Think
how a feeling (or even a memory) of embarrassment makes your face red, how
apprehension makes your palms sweat, how pain can blot out any other thoughts. It is
obvious that the dialogue between brain and body is an integral part of the brain’s
workings......To model the brain in its entirety, one needs to model a body too!”
(Greenfield 2000:104-5) Thus, if, as with Norman’s cat, the white rat that was the
world’s first cyborg, was able to manifest “rage, anger, affection, curiosity, play”
(Norman), then it must also have had an emotional experience of the addition of the
non-organic component to its body. This emotional experience is discounted in the
rational approach— despite the implication that many of the physiological results that
were observed in the animal when chemicals were passed into it through the osmotic
pump may have been emotional reactions— like the flush of anger or the blush of
embarrassment— and not merely chemical reactions at all.

The relationship between the physical and the emotional we will return to again,
in later chapters. For now, it is enough for us to conclude that the rational, reductive
scientific methodology of Norman and others, as inherited from Boyle, when contrasted
with the holistic approach as described by Dreyfus and practiced by Greenfield, is shown
to be both at odds with already established and accepted approaches at the microcosmic and macrocosmic scales, and overly simplistic to the extent that it in many respects quite misses the point of its own enquiry. The rationality promoted by Boyle and pursued on the materialistic path of Modernity, moreover, is shown to be a less intelligent, less skilful approach to understanding the world than the arational, holistic approach being taken by others.

II) Stelarc, Kac & Ju90: The Sociality of Things

Turning to our Cyborg performers, and the ideas on the remodelling of the human body put forward by Stelarc, one might, indeed, turning this argument on its head, remind Stelarc that in order to remodel the body, one must necessarily also remodel the brain. In Stelarc's published writings he lays out his concept of the 'obsolete body.' (Stelarc 1998) Essentially, in this reconceptualisation of the body, what Stelarc does is to take the human body out of its originary, 'natural' environmental context, detaches it from the world from which it 'evolved', and places it in the cold, efficient, rational world of scientifically constructed things. In a sense, the body is transplanted into the strict conditions of Boyle's laboratory. Unsurprisingly, in this new context, the body is not seen in a particularly good light. As he says, it is "neither a very efficient nor very durable structure," from this new perspective – though the extraordinary tale of its survival, adaptability, and flourishing through the Ice Ages to colonise every corner of the planet is conveniently overlooked.

Climate change, incidentally, is the latest fashion in explanations for the development of the human brain. During the course of the last of the great Ice Ages, when a warmer interglacial period came to an abrupt end – apparently in a cataclysmic couple of years – the forest home of early hominids dwindled, giving way to arid plains (Leith 2001). Proper stone tools appeared at exactly the same time. The suggestion is that the forest environment was carried with the early hominids onto the plains, in the form of tools and clothing, and that these new developments were closely related to the
development of human intelligence, (Leith 2001; Imber 2002). A wonderfully adaptable and durable structure, then, this human body, after all.

Stelarc complains that the body "malfunctions often and fatigues quickly; its performance is determined by its age" (Stelarc 1994). It is surely a matter of faith that the products of science and technology are any different! "Its survival parameters are very slim – it can survive only weeks without food, days without water and minutes without oxygen.” Environmental factors are no less essential, of course, for the ‘survival’ of machines. Electricity is fairly fundamental for their functioning, as are optimum conditions of temperature and humidity.

Stelarc’s ‘obsolete body’ is, he complains, not a ‘modular’ body, whose parts would be easily exchangeable, replaceable. He wants to map ‘post-evolutionary’ strategies. He believes "It is time to question whether a bipedal, breathing body with binocular vision and a 1400cc brain is an adequate biological form. It cannot cope with the quantity, complexity, and quality of information it has accumulated; it is intimidated by the precision, speed and power of technology and it is biologically ill-equipped to cope with its new extraterrestrial environment.” (Stelarc 1998)

The extra-terrestrial environment is indeed where Stelarc’s ‘post-evolutionary’ body must find its home. Clynes’ and Kline’s original coinage of the word ‘cyborg’ back in the 1950s was to describe their concept of a self-regulating man-machine system, an enhanced man who could survive in extra-terrestrial environments (Kline 1960). Perhaps, indeed, technology presents us with the possibilities of a new cataclysmic climate change, to which the human body must adapt. Stelarc offers us a number of options for the redesign of the body that can attain "planetary escape velocity" – all treating the human body as Norman does his cat, as Clynes and Kline did with their white rat – in a vision of human beings living in space.

This vision, however, is another example of the disjunction of understanding between different scales. On the planetary level, the human race is quite clearly very
much a part of the global ecosystem, created by it, fed by it and supported by it, for all that our voracious appetite for raw materials that we can process and move around in it seems to be having a devastating effect upon its functioning. The products of Boyle's laboratories around the world, the hybrids which link Nature and Culture, and join people and things together in the seamless fabric of our society, are as plain as day to the eye that sees. As Latour asserts, we in fact deal with them everyday. One glance at the newspaper will reveal issues linking "the Pope, French bishops, Monsanto, the Fallopian tubes, and Texas fundamentalists gather[ed] in a strange cohort around a single contraceptive." (Latour 1993:2)

Indeed, situated at the cutting edge of such hybridisation, in the world of the cyborg, Eduardo Kac shows us in his fascinating, disturbing, thought-provoking and prescient interactive art works quite how visceral such invisible networks have, in the late 20th / early 21st century, become. The hybrids being generated between things and people, between the mobilisation of nature by scientific endeavour and the supposedly free and unhindered citizen of the modern democratic state, threaten to render that supposed freedom completely obsolete.

In his November 1997 'work-experience' "Time Capsule", which he describes as "somewhere between a local event-installation, a site-specific work in which the site itself is both my body and a remote database, and a simulcast on TV and the Web," Kac implants "a microchip that contains a programmed identification number and that is integrated with a coil and capacitor, all hermetically sealed in biocompatible glass" into his ankle. (Kac 1999) The chip in Kac's ankle carries a 9-digit identification code, not unlike a social security number, that can be scanned and logged into a database automatically, effectively tracking his whereabouts. During the initial event-installation, after inserting the implant, Kac then proceeded to register himself, on the web, in a remote database located in the United States. "This is the first instance of a human being added to the database," he writes on his own website, "since this registry was originally designed for identification and recovery of lost animals." Kac registered himself
"as animal and owner under my own name." (Kac 1999) Crucially, he says, "I chose the ankle because it has so much symbolism. The ankle is where human beings in the past have been branded and chained." (DeMocker 1999)

This is not the experiment of a charismatic but slightly odd English professor. This is the visceral conjoining of flesh and metal on an industrial scale. In his piece, "A-positive" the human body (Kac’s in the demonstration) donates blood to a robot, which extracts from it enough oxygen to support a small flame; in exchange the robot (or biobot) donates dextrose to the human body, which accepts it intravenously. As Kac has said, "We are no more masters of our machines than we are at their mercy." (Kac 1999) A-Positive and Time Capsule bring the human body into the heterogeneous networks of hybrids in a very deliberate way, including the body as a set of things – like Stelarc’s ‘modular’ body – represented to us as Hobbesian Citizen-Subjects. We are made to confront the machinic qualities of the body as our property, to adjust and manipulate as we see fit. But, for all the arguments Kac uses in his text on Time Capsule against the boxing of the body by the current desktop interface, and in favour of the potential of moist interfaces, the idea of giving up one’s identity as a unique human being to an online database of animals – albeit in an Interactive Art context - represents surely something of an ultimate in dehumanisation. So, what effect does the ‘obsolescence’ “of the skin as a protective boundary demarcating the limits of the body” and the introduction of wet interfaces have upon personal responsibility? Are we moving into an era where, legally, you can go, sorry it wasn’t me officer, it was the computer moved my arm? This question was put to Kac during the interview undertaken with him in late 1999. In answer, he told the story of car-tagging in the US. There is a company in the US, he says, that makes tags for cars – very similar to the tag he implanted that’s made for animals, except bigger, and designed for cars. They allow one to use a satellite to find out where the car is, and retrieve it.

Kac: …… and he gets thousands of calls all the time wondering if this technology’s available for children.
Kac then raises the question "one argument is parents always make decisions on behalf of children, and if the price of re-uniting a family would be a small invasive procedure, you have to ask what would be the worst that could happen." What is worse: a child being separated forever from its parents, or having an implant? Kac is at pains to say he is not advocating it, but that his art "certainly points to that direction".

Amazingly, this practice is already being pursued — less than three years later — for real, in the United States, with parents in the UK already showing interest. In March 2002, a family in South Florida announced plans to be the first in the country to have the VeriChip, a tiny radio-frequency device about the size of a grain of rice, implanted in their bodies. The VeriChip is being marketed, pending trial-run approval by the U.S. Food & Drug Administration, by Applied Digital Solutions. In December 2001, the company announced that it had developed a miniaturized, implantable identification chip, called VeriChip that can be used in a variety of medical, security and emergency applications. About the size of the point of a typical ballpoint pen, each VeriChip will contain a unique identification number and other critical data.

The social implications of these developments in the relationship between People and Things are wide-ranging. The Hobbesian citizen, supposedly the one who constructs society and freely determines her own destiny, in truth finds that there are innumerable objects busily jostling for position in the determination of how she lives her life.

Indeed, the very institutions to which we turn for help are all too often the source of dehumanisation. The identity of the individual engaged in such a system becomes very much at stake. During the interview undertaken with Ju90 a number of questions were put to her, geared towards trying to elucidate how her experiences with doctors, hospitals, and the health service in the UK in general, had affected her identity. Her response was illuminating:-
Ju: I've certainly over the last ten years developed a very strong identity as a disabled person, and yet although my impairment levels have changed in that time - specifically ten years ago - more and more I look back and I realise that ... I've always been disabled.

Ju has had health problems and visual problems from the time that she was born. But although she'd not had any significant mental health problems, upon acquiring her medical records she was astonished to see that she had been “tagged as having mental health problems at quite an early age”. Looking back, she could then see that on a number of occasions she had been “misdiagnosed as suffering from stress when I've actually had very concrete measurable organic problems” and she is clear that she has been a victim of a well documented phenomenon, that “as soon as you get any kind of mental health tag on your medical records that will always be the first thing that's brought up.”

Ju Gosling's description of how her experiences have affected her as a person is quite startling. Her comments regarding the misdiagnosis of "concrete measurable organic problems" as stress, and how the early taint of "mental health problems" has affected every consultation since, is very revealing of the kind of 'identity' practitioners of the reductive medical model have woven around her, over the years, and how the institutions in which medicine is practiced work. The dismissal of her physical problems as 'women's problems,' as being somehow 'hysterical' or merely down to 'stress,' is certainly open to the interpretation that the "credible, worthy, well-to-do" witnesses - who were all male - whose opinions formed what we might dub 'the medical establishment', suffused the discursive formation of medicine with their own chauvinism - an institutionalised chauvinism. We have here, again, the dismissal of a holistic approach to the person as 'woman's intuition' by a 'masculine rationality' believed to be superior (Dreyfus 1986:29).
From Ju Gosling's experience, as we shall in greater detail later in this thesis, it is apparent that, certainly in this masculine 'medical establishment', technological artefacts are bound up with social status, and sometimes impute a 'cyborg' status to the individual associated with them. Braces, wheelchairs, spectacles and hearing aids are all bound up with social status. But such status is contingent. What social status becomes imputed to implant chips remains to be seen. Their invisibility to the naked eye is sure to raise suspicion around them. How secure will they be to the outside interference of hackers? Will, indeed, their susceptibility to reprogramming by pranksters and fraudsters render them useless as identification devices? Will they affect hospital and aeroplane environments like mobile phones? Will they be seen as cool, cyborgian accessories, or as marks of an oppressive society that 'tags' both its criminals and its children. What will happen to a child's implant when that child grows to adulthood?

One thing is for certain: the Hobbesian citizen will have to contend, in the future, with the influence of many more of such Things in the determination of her destiny.

III) Matter/information duality

We have seen, then, in our contrasting of the approaches of Profs Norman and Greenfield, and through the experiences of our three interviewees, that the rational and the holistic approaches to understanding are potentially mutually exclusive. If Greenfield is right, in short, much of what Norman would like to do will simply not be possible. We have seen how the holistic perspective is something that not only informs our understanding of Life on Earth, but of the workings of the brain and body, of the nature of human consciousness. We have seen how the linear approach can spawn such a concept as the 'obsolete' body, and caught an inkling of how the linear medical approach can completely miss what is actually wrong with someone. We will return in much greater detail to the problems of medicalisation in due course. For now, it is necessary for us to update our understanding of the linear, for in the 20th century Boyle's empirical science has taken a new turn, and in examining the nature of this turn, and contrasting it...
again with more holistically minded voices, we shall see not just how the cyborg is located at the fracture of the linear and the holistic, but gain an insight into the performative power of Boyle’s theatre-laboratory, and how Performance pervades our society to its very core.

Boyle’s empirical science has spawned an entire world-view into which Prof. Norman’s soulless mechanical-human, Stelarc’s ‘obsolete’ body, and the institutionalised chauvinism of the medical establishment all fit. The 20th century science to which the modern cyborg is directly attributable, moreover, is one that shows all the tell-tale signs of its 17th century “credible, worthy, well-to-do” merchant fathers. Taking the mute objects of a Nature that has always already been there it breaks down the boundary between organic and inorganic, and refigures both in a newly pattern-oriented conception that deals with essence rather than substance. Its internal rules are based upon the model of ‘self-interest pursued within a system’ established by the self-same early merchant gentlemen. This science is that of Cybernetics, and as Gray reminds us, “Norbert Weiner’s elaboration of the idea of Cybernetics, of a technoscientific that explained both organic and machine processes as parts of informational systems, was the culmination of many different currents in Western culture. (Gray 1995:5)

As Tomas spells out for us, “In its most extreme form, Wiener’s cybernetic organism could take the form of pure information - ‘human information’ - nothing more than a given ‘pattern maintained by...homeostasis, which [was] the touchstone of [a] personal identity’ to be transmitted as a message because it was in the first place a message. [Wiener 1954 p96]“ (Tomas 1995:35) (my emphasis.) Wiener’s science is extremely clever in the way that it completely refigures fundamental concepts in order to legitimate itself.

Unsurprisingly, his primary interest is in automation. Basically automata are machines that perform tasks: they need “effector organs” - their equivalent of arms and legs; sense organs - photoelectric cells etc - to provide feedback: “the property of being
able to adjust future conduct by past performance”; and finally central decision organs, to "determine what the machine is to do next on the basis of information fed back to it – [Wiener 1948 p32-3]" (Tomas 1995:25)

"Wiener's cybernetic automaton was conceived as an active, hierarchically governed, self-regulated and goal-oriented machine,” Tomas continues, “which was bound through a particular time/space logic - the adjustment of future conduct through a comparative assessment of past actions - to its environment... The particular power of cybernetics' analogous logic resided in the fact that it was able to redefine the concept of 'life' itself in order to bring it in line with a cybernetic automaton's operational characteristics.” (Tomas 1995:25) What we are looking at, of course, is the 19th century's mechanistic, dysteleological conception of life as something fundamentally without purpose or design, (and therefore without divinity) - and thereby without meaning. This is the theory which holds that an organism contains a model of the actual world and a model of the desired world and acts so as to make the actual world conform to the desired. There is no room here for such teleological notions as natural processes being determined by their utility in an overall natural design. No room, then, for such human characteristics as hope, or the pursuit of an ideal.

The conception of life, indeed, enters here a new phase, characteristically mirroring the technology of the age. The body, once seen as a "malleable, magical, clay figure", (termed by Wiener himself as the "mythic Golemic age,”) which became, in the Renaissance, "the body as clockwork mechanism,” and in the Industrial Age, some "'glorified heat engine, burning some combustible fuel instead of the glycogen of the human muscles,'” becomes, in the 20th century, in the eyes of the cyberneticists, "an electronic system.” (Tomas 1995:23) Just as the ascendancy of the new sciences of time - not least longitude and latitude - and the clockwork paradigm helped to provide the break from the ancient world of catholic unity to the modern world of mechanism and industry, so the new science of informational systems, homeostasis and feedback, provides the break into the cyborgian future of the post-human.
Amazingly, though he attempts to address the issue in his work, Wiener concludes, in the end, that it is "best to avoid all question-begging epithets such as 'life', 'soul', 'vitalism', and the like, and say merely in connection with machines that there is no reason why they may not resemble human beings in representing pockets of decreasing entropy in a framework in which the large entropy tends to increase." (Tomas 1995:26)

As Lovelock says, "the question of defining real life in cybernetic terms remains unanswered and is seldom discussed." (Lovelock 1979:4) Cybernetics, as Tomas concludes, "operationalised the question of 'life' by displacing the concept of organism from biology to engineering, thus effectively transforming it into a hardware problem."

Thus, "according to its new existential parameters, Wiener's cybernetic automaton was 'organic' and 'alive' precisely because it was operationally active, that is, it was 'effectively coupled to the external world, not merely by [its] energy flow, [its] metabolism, but also by a flow of impressions, of incoming messages, and of the actions of outgoing messages.'"

Thus, in one stroke, organisms and machines are gathered together under one umbrella, to be "considered as two functionally equivalent states or stages of cybernetic organisation." It is the final victory of the dysteleological over the vitalist. There is no longer any distinction to be discussed. As such, "Wiener's cybernetic automaton marks an important threshold in the history of the human body." (Tomas 1995:27) In 'The Human Use of Human Beings,' Wiener suggests that "we have modified our environment so radically that we must now modify ourselves in order to exist in this new environment" (1954 p46) (Tomas 1995:39)

Just as Greenfield offers us a holistic take on the nature and unity of brain and body, and Ju Gosling a real-life contrast with Stelarc's wilder imaginings of obsolescence, so Katherine Hayles offers us a take on Cybernetics that shakes it to its foundations. As we shall see in a later chapter, the development of Cybernetics was no less contingent than Boyle's empiricism, and made, in similar fashion, foundational assumptions about the nature of existence that don't stand up to further scrutiny.
For now, it is enough for us see that what Hayles makes clear is fundamental to the above-mentioned problem of the decoupling of mind and body – the notion of self as pattern, free from substance. Taking the concept of embodiment as her starting point, Hayles argues that this concept underlines the fact that “thought is a much broader cognitive function, depending for its specificities on the embodied form enacting it.” (Hayles 1999:xiv) In short, her book is an attempt to re-couple mind and body, to reforge the link between pattern and instance, between information and the substance which instantiates it.

Citing Wiener’s suggestion that it may be possible to telegraph a human being, Moravec’s contention that it may be possible to upload consciousness into a computer, the Star Trek transporter machine, and the belief amongst Molecular Biologists that the body is an expression of informational code (DNA), she summarises that “...a defining characteristic of the present cultural moment is the belief that information can circulate unchanged among different material substrates.” (Hayles 1999:1)

But this belief, she asserts, is subject to the rules of reflexivity. Reflexivity might be defined, in its most simple form, as a general scepticism towards one’s own and others’ knowledge or truth claims. But for Hayles it is much more complex. The rules of reflexivity are for Hayles quite performative: “the system generating a reality is shown to be part of the reality it makes.” (Hayles 1999:8-9). The classic example of this is Escher’s famous picture of two hands drawing each other, and for Hayles this is as relevant to science as it is to any other walk of human endeavour. Citing Latour’s “Science in Action” she tells us that “scientific experiments are shown to produce the nature whose existence they predicate as their condition of possibility.” (Hayles 1999:8-9) Reflexivity is indeed quite important here, as a further reminder that holistic approaches involve a higher skill level and greater understanding than the traditional reductive rational approach of Boyle and his descendants. Reflexivity is something already well established amongst performance theorists, too. In The
Anthropology of Performance, Turner defines reflexivity as a condition in which groups or individuals "turn, bend, or reflect back upon themselves, upon the relations, actions, symbols, meanings, codes, roles, statuses, social structures, ethical and legal rules, and other socio-cultural components..." (Turner 1986:24)

There are, in fact, for Latour, several types of reflexivity that can be identified from various fields of study. There is introspective reflexivity – a simple self-critical approach that leads one to clarify one's research position and to apply to one's work the same criticism addressed to other works, but also, and perhaps more importantly, this introspective reflexivity leads one to question one's empirical field in general, and the prevailing representations and conceptions that define it (Latour 1988). Beyond this, however, another form of reflexivity comes into play, known as 'meta-reflexivity' which invites the researcher to include the social determinants of science in the research process. Thus a study of any scientific process might also include reference to the funding and political climate in which the science took place. Latour's form of reflexivity, known as 'infra-reflexivity' (Latour 1988), criticises this kind of reflexivity, in an attempt to go further and beyond it. To simply take social factors into account, for Latour, is to, on the one hand denigrate the real value of empirical work by undermining it with relativism, and on the other hand nonetheless grant the researcher with a privileged position enabling him to decipher social realities. As he says, "If meta-reflexivity is marked by an inflation of methods, infra-reflexivity is characterized by their deflation. Instead of piling on layer upon layer of self consciousness, why not have just one layer, the story, and obtain the necessary amount of reflexivity from somewhere else? ... [J]ust offer the lived world and write" (Latour 1988:170) An approach I have tried to take in this performance thesis.

Latour's argument is that the problem is that accounts are not believed enough rather than believed too much. The task for reflexivity is to make texts
stronger, rather than weaker. In short, for Latour, the only option is to own up that it is narrative that we are dealing with - tying "claims to as many resources as possible" (Latour 1988:161).

But the crucial element of all this that Hayles highlights is that the social determinants in the scientific process are so prevalent that the results of the research process are often pre-determined by the foundational assumptions of the research question. This is almost what one might describe as an 'intra-reflexivity', whereby the basis upon which something exists is its own product. This is profoundly performative. In this reading, the doing of science creates the objective world that science purports to study.

Wiener's act of reflexivity in refiguring Life as a cybernetic system, then, carries the sting in the tail that a society increasingly based upon cybernetic networks will generate the conditions for the transfiguring of the human into the cyborg. It is not dissimilar from the concept of the self-fulfilling prophecy. As Hayles underlines, "The point is not only that abstracting information from a material base is an imaginary act but also, and more fundamentally, that conceiving of information as a thing separate from the medium instantiating it is a prior imaginary act that constructs a holistic phenomenon as an information/matter duality." (Hayles 1999:13) We are again in the world of "as if", where what is actually a joined up holistic totality is reconceived as a set of demarcated, separate entities - information and matter.

This "as if", and the very real reflexivity that Hayles points out in Wiener's cybernetics is key to the basic contention of this first chapter concerning the split between things and people: the laboratory of Boyle's empirical science, in short, was nothing less than a new efficacious performance space, a third space beyond the Temple and the Theatre, where an elaborate new game of "as if" was played out with mute objects - puppets - whose voices were sounded off-stage by "credible, worthy, well-to-do," gentleman witnesses for whom the best of these scenes would play to packed
houses in the markets, where the merchandise could generate capital for further such endeavours. Science is indeed is the handmaiden of technology, and humanity was long ago transfigured into the servants of these self-same puppets.

This elaborate game of "as if," this puppet show of empirical science, performatively enacts and brings into being the human actors required for such a show's completion: the capitalist, the industrial worker, the merchant, the consumer; the whole cast of characters gathered around the puppets of laboratory science. Long before Wiener's cybernetics began the blending of people and things into the cyborg, things took precedence in the construction of (Western) human societies.

IV) Bergson on intuition

Now the mediaeval Catholic world, the holistic chain of being from God at the top down to the lowliest blade of grass, the great unity of the universe that this new construction of reality sundered so effectively and so completely, required one very important and crucial element of what it is to be human, an element that the new construction needed to be effaced, set aside, belittled, and ultimately ignored: the means by which we had, in the Catholic world, communicated along the chain of being, our intuition. As we have already seen in our discussion of Norman and Greenfield, the ideas of Dreyfus are of critical importance here. In his understanding of the nature of the holistic, intuition is central. It is not some supernatural inspiration nor some form of wild guessing, but, for Dreyfus, an everyday part of consciousness (Dreyfus 1986). But what exactly is intuition, and how can a better understanding of it aid in our discussion of the disjunction between rationality and holism? Where does intuition come from? If it is neither supernatural nor wild guessing what function of consciousness does it represent? In this section, the author proposes to delve into the work of an author regarded by many as 'lapsed' or 'passé', to reintroduce or rediscover the work of one of the most radical philosophers of the early twentieth century: Henri Bergson. Nor is this author
alone in this endeavour, as we shall see in later chapters of this thesis, for both Merleau-Ponty and later Gilles Deleuze can be shown to have built upon Bergson's work.

As Latour points out, the "new constitution" set out by Hobbes and Boyle and their followers had "to settle the question of God by removing Him for ever from the dual social and natural construction, while leaving Him presentable and usable nevertheless.....No one is truly Modern who does not agree to keep God from interfering with Natural Law as well as with the laws of the Republic." The 16th century Reformation brought God down from the heights only accessible by priests into the hearts of men, and the Glorious Revolution ensured that "the all-powerful God could descend into men's heart of hearts without intervening in any way in their external affairs." (Latour 1993:33)

During the 18th-19th centuries, the new constitution became increasingly mechanistic and rationalist in its approach to the problems of philosophy and politics, the descendants of Boyle gathering unto themselves a positivism that quite simply ruled out study of what could not be fabricated in the laboratory as beyond our ken and unworthy of comment. The puppets and their masters were taking centre-stage in society. But the debate was always complex.

Despite the effacement of God during the 17th century, the old Aristotelian principle of a life force in the universe, and thus Vitalistic philosophy, lived on. Vitalism, indeed, was a continual thread throughout the period, though always in tandem with the new mechanism. No-one was exclusively vitalist or exclusively mechanist. Even the most apparently ardent vitalist rested some of his ideas on the mechanists, and, conversely, even the strictest mechanists had some element of vitalistic principle in their formulations. "Any comforting notion" moreover, "that religion was vitalistic while science was mechanistic proves to be in error, both in the earlier period (Restoration) and the later on (French Revolution)." (Rousseau, George, "The Perpetual Crises of Modernism" in Burwick 1992:45) The arguments between Abernethy and Laurence, both Professors at the Royal College of Surgeons, are a case in point (Shelley 1994 Preface).
But certainly by the middle of the nineteenth century the mechanists seemed to have the upper hand.

At the turn of the 20th century a host of philosophers including William James, Bertrand Russell and Henri Bergson engaged in dismantling the 19th century concept of the intellect and undermining what Russell called "that scientific optimism which made men believe that the kingdom of heaven was about to break out on earth." (Burwick 1992:3)

This is not the place for a proper assessment of the work of Henri Bergson, nor of the Vitalist tradition to which he belongs, and to which we will return in the next chapter, but there are some fundamental tenets of his philosophy which are extremely relevant to the discussion in hand. Bergson's most enduring legacy, in many respects, is his extraordinarily lucid and damning critique of scientific materialism. To Bergson, it is intuition, the direct apprehension of process, which is the discoverer of truth - intuition, not analysis, reveals the real world. This is to agree with Dreyfus that the highest skill level, the intelligence of the expert, makes use of an intuitive grasp of the whole that is far more complex than the more simplistic approach of competent rationality (Dreyfus 1986).

Crucially, in his famous 1907 book, "Creative Evolution", (Bergson 1944) Bergson laid out the proposition for which he is now famous: that "the universe is best understood on the model of the development and elaboration of consciousness."
(Burwick 1992:4) Modern physics, many argue, has discovered that Bergson was right. Human consciousness, in this reading, is a constant struggle against a slump back into sentience: it is "action unceasingly creating and enriching itself, whilst matter is action continually unmaking itself or using itself up." (Burwick 1992:4) But these opposing processes are going on simultaneously; so Bergsonian philosophy "is also strongly dualistic, when one thinks of this conflict between matter and spirit." (Burwick 1992:4)
It is the primacy given by science to the intellect which Bergson questions above all else. His philosophical method is essentially one which sees in a theory of knowledge the awareness of the limits of intellect, an understanding that an intellectual grasp of the universe is necessarily limited to the extent of our knowledge, almost a humility that acknowledges the unknown and the unknowable in this vast universe. It is then the task of a theory of life, in tandem with that theory of knowledge, to attempt to see beyond those limits, to see how they originated, how they may be expanded. The two theories should spiral around one another, chasing each other into ever deeper and broader awareness. (Bergson 1944:xxiii-xxiv)

Intellect, then, is the power of consciousness to fix, to apprehend a single moment of the constant flow of duration, to take a snapshot out of real time, and to analyse and understand it. But like the natural historian who fixes a butterfly upon a pin, the intellect can only ever analyse and understand that which is already dead, that which is past, a moment gone. Only the intuition, apprehending real time, can truly know how that butterfly flies, in the moment that the creature passes by.

Time, moreover, was an element of the new scientific materialism to which Bergson addressed some of his most fascinating insights. Essentially, Bergson’s contention was that modern thought laboured under a false phenomenology of mental states - essentially, a tendency to conceive and describe in spatial terms what he eloquently located in temporal terms that formed the core of his philosophy.

In Bergson's view, human experience does not perceive real life as a succession of demarcated conscious states, progressing along some imaginary line, but rather as a continuous flow. Duration, the constantly growing and expanding totality of the past as time unfolds into the future, is perhaps his most key concept. This is crucial to our discussion of the moderns' celebration of the new, and of their assertion that the old ways of continuity must be broken up into distinct and demarcated spheres: scientific, political, and religious; laboratory-fixed 'timeless' conditions that can be reproduced.
precisely; the certainties of measurement. Bergson pointed out a distinction between the concept and experience of time: to Bergson, the descendants of Boyle in their artificial world of fabricated facts were operating in their own conception of time, observing objects and events in succession, but, in reality, time is presented to consciousness as duration - an endlessly flowing process. This is analogous to Latour’s notions of linear and spiral time (Latour 1993). Bergson argued that ‘real time’ (durée réelle) is experienced as duration and apprehended by intuition, not through separate operations of instinct and intellect. He claimed that real time can never be grasped through common scientific methods. To Bergson, it is intuition, the direct apprehension of process, which is the discoverer of truth - intuition, not analysis, reveals the real world. Material objects do not exist separate from a ‘fourth dimension’ of time, in which events involving these objects occur, but time and matter are indistinguishable, the flow of unfolding evolution is the continuous movement of a space-time whole that is quite simply not divisible in the way that Boyle’s descendants persist in doing. Bergson even differed with Einstein on this crucial point, challenging the theory of relativity in ways only the later quantum physicists and chaos theorists would dare.

Bergson’s is a holistic philosophy that brings space, time, matter and consciousness together into one indivisible flow – a ‘seamless fabric’ not even Latour enunciates. The philosopher William James said admiringly at the time that Bergson had "killed intellectualism definitively and without hope of recovery. I don't see how it can ever revive again in its ancient Platonising role of claiming to be the most authentic, intimate, and exhaustive definer of the nature of reality." (Burwick 1992:4) Criticism of Bergson, however, during the inter-war period, consigned his ideas to the past. To Burwick and Douglass, the eclipsing of Bergson suggests a disturbing possibility: “that his work is a repressed content of modern thought.” (Burwick 1992:7)

In summary, then, for now, through the eyes of Latour, and Bergson, among others, we can see that the modern constitution which demarcates science and politics – the representation of things and of people – is both a paradoxical set of secular beliefs
proclaiming a modernism that in truth has never really existed – the hybrids of the
supposedly distinct nature and culture have on the contrary proliferated in the non-space
of their denial – and, in addition, a positivist dismissal of the intuitive which is our truest
grasp of what is real.

Moreover, we can see how on a performance level the creation of the laboratory
was tantamount to a third performance space, alongside Temple and Theatre, a place of
puppetry where the mute objects of science played out their roles in the carefully
constructed set of the laboratory, and their voices were translated by scientists, the
puppet-masters of the new performance. The performative power of this development
was to prove immense, with the whole of society and all the roles within it being rapidly
reformulated into a world where things held centre-stage. The laboratory supplanted the
temple as the performance space at the centre of civic society – live anatomical
dissections were for a time the most popular public entertainments of their day, playing
to packed houses. To this day the laboratory in which human beings undergo surgery is
called a ‘theatre’. The shaman-alchemist wrested power from the shaman-sage. Small
wonder that to this day the white-coated scientist is so often portrayed as priest of a
modern religion.

iii. The not not oneself

But how is it, one might ask, that the mute objects of science can be viewed as
puppets, and ourselves as performers of roles in a play in which these puppets are the
central characters? Returning, by way of conclusion to this first chapter, to our
anthropological discussion of Performance, we touched earlier, very briefly, upon
Schechner’s foundational principle of performance theory that places any performance
along a continuum between efficacy and entertainment. We might posit, in relation to
Goffman’s working consensus of personal performances, (Goffman 1990) that this places
every performance in social interaction as "efficacious" (Schechner 1982): it is the
purpose of the performance to bring about results - in the definition of the situation.
Speaking some few years later in the context of his book on anthropology, Schechner slightly reformulates, and adds to his view on the efficacy-entertainment braid: "Either permanently as in initiation rites or temporarily as in aesthetic theatre and trance dancing, performers - and sometimes spectators too - are changed by the activity of performing." (Schechner 1985:4) It is in the study of the 'grey area' of 'ritual' performance that the concept of change becomes most pertinent. It turns out that consciously taking on another identity, whether that be the identity of a deer, of a God, or of a character in a play, is an 'act' only distinguishable from the performance of our own identity by its consciousness. Nor is it merely our selves that undergo such transformations - Things are taken up into the action too:

"The transformations of being that compose performance reality evidence themselves in all kinds of anachronisms and strange, incongruous combinations that reflect the liminal qualities of performance. That the deer singer's water drum sits in a modern metal cooking pot, straight from the kitchen right next door to the dance ramada, is not only a question of modernisation, of making do (which performers are famous for around the world), but an example of transformative doubling. The kitchen pot is analogous to the dancer and the singers: the pot does not stop being itself even as it serves to evoke the flower world of the deer songs. Both pot and performers are "not themselves" and "not not themselves". Pot and performers link two realms of experience, the only two realms performance ever deals with: the world of contingent existence as ordinary objects and persons and the world of transcendent existence as magical implements, gods, demons, characters. It isn't that a performer stops being himself or herself when he or she becomes another - multiple selves coexist in an unresolved dialectical tension. Just as a puppet does not stop being "dead" when it is animated, so the performer does not stop being, at some level, his ordinary self when he is possessed by a god or playing the role of Ophelia." (Schechner 1985:6)

It may also be said that the "ordinary self" is as contingent as the performed self - that we are at all times and in all circumstances "not ourselves," performing the roles associated with the situations we find ourselves in, and at the same time "not not
ourselves," for it is these very roles that define us. In the light of Bergson's notion of the *durée réelle* (Bergson 1944) perhaps, as social actors, we are forever dancing upon the liminal tension between what the cumulative indications of the past delimit as "ourselves," and what the multiplicities that the imminent potentials of the present make possible. It is, in fact, constantly necessary that the possibility of being "not ourselves" can allow us to choose amongst those imminent potentials, in ways that can allow us to grow, whilst being inevitable that the weight of the cumulative past must necessarily ensure that we are "not not ourselves" either. Finally, what faculty other than the intuition can best make such decisions at the crest of the unfolding present, if the intellect, by definition, is part and parcel of the cumulative past, and the means by which we look back upon it in order to understand it? Multiple identities, in short, is perhaps a state which we all enjoy, all the time. It is a heightened, more conscious multiplicity, perhaps, which the Performer attains, be it on a Western stage, or in some 'anthropological' ritual. The distance between the performer and the character s/he portrays is one which the Japanese Noh masters and the Chinese tradition have known and instructed their novices in for several hundred years. In the more recent Euro-American tradition, Grotowski and Brecht, undoubtedly influenced by their studies of Eastern performance, stressed this distinction with equal fervour. In that distance a commentary may be inserted - a political one in Brecht's case, for example - or "as it is for postmodern dancers and performance artists - an aesthetic or personal commentary." (Schechner 1985:9) It is perhaps the consciousness of this distance which distinguishes between the nature of everyday performance and that of the ritual or professional performer.

In what Schechner describes as "twice-behaved behaviour," or "restored behaviour," - which he argues is at the basis of all performance, and which brings Butler's concept of "citing" to mind (Butler 1993) - the Performer gains the opportunity to deliberately take on identities to bring about personal change. This is, literally, to "rebecome what they once were - or even, and most often, to rebecome what they never
were but wish to have been or wish to become," in order, through that performance experience, as a performative experience, to enact into being a changed self. As Schechner emphasises, "Performance means: never for the first time. It means: for the second to the nth time." (Schechner 1985:36) This is profoundly citational. But crucially, "twice-behaved behaviour" involves choices: "There is a continuum from the not-much-choice of ritual to the lots-of-choice of aesthetic theatre. It is the function of rehearsals in aesthetic theatre to narrow the choices or at least to make clear the rules of improvisation. Rehearsals function to build a score, and this score is a 'ritual by contract': fixed behaviour that everyone participating agrees to do." Even the shaman rehearses the ritual, as novice learning from the master. Where there is choice, there is the possibility of revision; and "That's what theatre directors, councils of bishops, master performers, and great shamans do: change performance scores." (Schechner 1985:37) This author would add to that list, of course, scientists and technologists.

What we have here is as much a picture of being "ourselves" as it is one of being "not ourselves". The fact that we are also "not not ourselves" when we are "not ourselves" only serves to underline this. In a very similar fashion to the ritual performer described above, the social actor takes on a role in order to become the person which that role implies. Throughout our lives in all the social and working situations in which we find ourselves we are benefiting from our experience of the last time we found ourselves in such a situation and rehearsing for the next. 

"Restored behaviour" and "citation" are in fact incredibly closely related concepts.

The political implications of this interrelation were realised in Western Theatre practice during the last century. Augusto Boal, in his 'Theatre of the Oppressed', "developed the revolutionary potential of a restoration, processual view of performance as [a] revisioning, reassembling, and reworking of social reality." (Conquergood 1992:44)

In effect, through the 'theatre of the oppressed', Boal attempted to present people with the possibility of changing themselves and their social condition through the process of
rehearsing "restored behaviour," and exercising the potential for choice within that process.

We might suggest that the 16th-17th century merchant fathers of modern capitalism, as they developed a new self which could relate at-a-distance, retaining room for calculated self-interest, were themselves performing precisely this revolutionary practice, the role of merchant one that would eventually become the new norm for selfhood itself - the detached Individual Subject. (Postman 1987; Weber 1992) We became, in the famous phrase, a nation of shopkeepers – and it was the creation of produce, brought about by Boyle's new empirical science, which necessitated this change. Produce, goods, the puppets of the new science, now centre-stage in Western society, required an army of people around them to move them about, to manage their distribution. The roles these people played were set for them by the requirements of this distribution process. The "restored behaviour" of buying and selling goods carved out for the inhabitants of western societies the roles that were to define them for the coming centuries. The nation of shopkeepers was created by the goods in the shops.

C. Conclusion

In our first chapter, then, by way of introduction, we have argued that Performance is a constitutively human activity, and that it is by nature a repetition, a display of "restored behaviour" (Schechner 1985). We have also introduced the three cyber performance artists whose work we have already begun to refer to in our discussions.

We have then been introduced to a form of anthropological study, and elucidated the sense in which the term is used in this thesis. Anthropology, in this sense, is an attempt to step outside of Western society and view it as a totality, to step beyond the boundary divisions that demarcate the disciplines of modern thought and attempt to see our culture as an inter-related whole, with a seamless fabric, in the way that real
anthropologists do with other societies and cultures, yet find impossible to do with our own.

We have then seen, in an ‘anthropological’ look at Western culture, how at the roots of the Modern a false split between Nature/Things and Culture/People, a false and radical break from the past into a non-time of permanent present, took place, setting up a society that pretended its citizens were sole arbiters of their own destiny, when manifestly it was the production and mobilisation of objects that glued that society together, gave it substance, and provided the flow of communication between its citizens. We have seen, through the lens of Performance, how these citizens in fact played the role of shopkeepers, how the objects in the theatre-laboratory of the new science of Modernity were in fact puppets, whose voices were spoken by the new citizens and whose own roles in the new society took centre stage, but whose existence was clearly demarcated outside the realm of politics.

We have thus traced the nature of the linear, rationalist, scientific perspective as demarcated by this Modern constitution, from its roots to its cybernetic present, and contrasted it with the holistic voices of those for whom an appreciation of the whole is paramount for true apprehension of the real. Time and again, we have witnessed the Cyborg at this fracture between the linear and holistic.

The synthesis of notions drawn from performance studies and science studies has therefore already begun, and in outlining the nature of capitalist endeavour, as fuelled by the new objects created by science, we have seen that it requires the performance of new kinds of cultural identity. We have seen how the nature of those objects themselves, and the way in which science creates them, may be seen as the performance of a new cultural identity in its own right. Indeed it may be said that the new constitution, as Latour describes it, is something which the “credible, worthy, well-to-do gentlemen” actually perform into being. This is a concept drawn from the theory of Performativity, which we shall address in the next chapter.
Many ends still remain loose, many issues only yet touched upon, which we must examine in far greater detail before we can see clearly the characteristic features of the cyborg, and the true depth of the ‘performance principle’ in the human condition. In the next chapter we shall examine the very nature of identity.
2. **Performativity**

In this second chapter we shall be examining the nature of identity – both for humans and for their artefacts, and introducing actor network theory as a means to describe the culture of modern western society that is populated by so many objects, as well as people. The notion will be proposed that artefacts should be considered not merely as actants but as performative actants in actor networks.

The chapter is divided into two sections: Identity and Performance, and Actor Networks. In the first section we shall look at the Presentation of Self, borrowing ideas from Goffman and the sociological tradition of social interaction to describe identity as a performance; at the Presentation of Roles, using Butler’s theory of performativity to show how the performance of identity is a citation of pre-existing roles; and at the Presentation of Status, using Foucault’s notion of the Statement to show how roles are organised in social hierarchies. In the second section we shall examine the nature of actor networks, and then present the original theoretical synthesis of performative actants, examining the notion through a discussion of attitudes to enabling technology amongst theorists of disability studies, and through an analysis of enhancing technology such as Norman’s neuroprosthetics.

a. **Identity and Performance**

So far in this thesis we have looked at the nature of Performance from an anthropological perspective, but the depth at which Performance, as a tool for analysis, can be used as a window into our lives, needs to be fully explored. In this chapter then, we will examine how each of us performs the roles allotted us, and how the very nature of identity can be considered, *performative*. We shall take this analysis in three interconnected stages: examining first the presentation of the Self in everyday face-to-face interaction, and looking closely at the nature of that Self. Secondly we shall examine the presentation of roles, looking through the window of performativity and through the
question of gender to see how far the self is defined by the processes of its presentation, how much that presentation may be said to be citing pre-given sets of actions, and stopping briefly to note that cyborgology has been the site of much of gender theorising. Thirdly we shall examine the presentation of status – how the roles that we cite fit into social hierarchies and how those citations themselves define the power that they wield.

i. Presentation of Self

This level of analysis of human identity and face-to-face interaction – using the trope of Performance – was initiated in the late 1950s by Erving Goffman, whose work we have already introduced. Here we will pause to examine it more fully.

Goffman considered “the way in which the individual in ordinary work situations presents himself and his activity to others, the ways in which he guides and controls the impression they form of him, and the kinds of things he may or may not do while sustaining his performance before them” (Goffman 1990preface). So Goffman's individual is an actor on a social stage, presenting him/herself to those around her. She is a social actor. We are all conscious of 'putting on an act' at times, behaving 'in an appropriate manner', according to the context we find ourselves in. But how many of us realize that we are doing it all the time, in every context, and that the act we feel most comfortable with, that we feel is truest to ourselves, is still an act – that the ‘true’ self we identify as our ‘selves’ is a performance, a presentation, too?

As we saw in our anthropological tour this very personal performance is as much a set of words and gestures – a set of actions both vocal and physical – that draws on the components of a shared language, as any more conscious performance in a more particular setting. It is “restored behaviour” even when we are talking to ourselves. But when we are communicating directly with others, Goffman pointed out, every act – both vocal and physical - consists in two parts, one conscious, and one unconscious. Simplistically, Goffman's social actor has two means of expressing herself: one conscious
what she 'gives' of herself; the other unconscious - what she 'gives off.' Those who comprise the audience for this individual's performance thus gain two impressions of her: one from what she gives of herself, which she controls, and one from what she gives off, which she does not control. His distinctions are actually more subtle than this: we have more control over the former than the latter, and are capable of fabricating both - deceit in the former case, and feigning in the latter. How often do we put on the right act whilst unconsciously giving away our discomfort or treachery? In short, in social interaction, according to Goffman, a fundamental asymmetry exists between performer and audience: the latter have access to information about the performer beyond and potentially contradictory to her intentional performance.

This is because even when we are performing an act we deem suitable for the setting - when, in short, we are being "not ourselves" - we are, of course, as in all performance situations, "not not ourselves" either. Just as the Noh actor wears a mask that betrays part of his face - to remind the audience that he is both the part he plays and also the actor playing the part - we cannot fail to display both the part we wish to play and the person playing the part. In presenting the Self we also present the presenter.

What the social actor gives and gives off naturally consists of many things. One element we should focus upon here is one's 'front,' as Goffman calls it. The 'front' is defined as that part of the individual's performance that is more or less fixed. It is "expressive equipment of a standard kind intentionally or unwittingly employed," (Goffman 1990:34) as part of the performance. The standard parts of front are (i) the setting: the environment in which the interaction takes place, e.g. one's office, front room (sic) etc. (ii) personal front: one's appearance - clothing, sex, age, racial characteristics etc. Front is therefore quite abstract, and general. Importantly, observers "need only be familiar with a small and hence manageable vocabulary of fronts, and know how to respond to them, in order to orient themselves in a wide variety of situations" (Goffman 1990:36). Front, indeed, often becomes a collective representation.
As such, the many and varied 'fronts' employed by social actors, considered as a totality, together make up what this author would call a 'social scenography' for the performer - the complete range of sets, costumes and props available to the social actor. This social scenography is precisely that part of ourselves over which we have, as individuals, the least control. It is perhaps that part of ourselves we might deem the most socially constructed, (if indeed there is any part that is not.)

As such, the social scenography of the individual is not only historically contingent, but the site in which cultural performance may be said to play itself out. The degree to which the individual is subsumed into, or able inwardly to distance him/herself from the conforming pressures of this social scenography will depend not only upon the strength of character of the individual concerned, but upon the force with which social construction is brought to bear. Our very notion of ourselves, in fact, of who we are, must inevitably be both a product of this social scenography, and defined by the extent to which we can distance ourselves from it. When "giving off" a particular front, in short, how far might we be said to be defined by it; how deep, in short, do such collective representations go?

I) Interaction

In social interaction, where the social scenographies of individuals intertwine, there are a great range of things that may occur. Consider, for a moment, the social scenography of an office manager: a Euro-American white male in shirt and tie, his jacket on a hanger in the background, sitting in a chair at a desk with a computer and an assortment of papers. There is a knock at the door. The social scenography of another individual is about to enter the office, and the relationship between the two scenographies will be crucial to the nature of the exchange between the two individuals. If it is a similar scenography, two managers meeting in the office of one of them, the balance will likely be comfortable. If the scenography of the other individual is, say, more normally a tropical rainforest, and the individual entering the office is wearing little
more than a loincloth and brandishes a spear, there is likely to be little point of contact at all between the two individuals — for all that they both might speak Portuguese.

Where peoples' fronts — their social scenographies — and their more individual performances meet, a very fluid, multi-directional, reciprocal influence is at play. The scenarios, or situations in which people meet both define and are defined by these performances and (shared) fronts. As Goffman describes: "When we allow that the individual projects a definition of the situation when he appears before others, we must also see that the others, however passive their role may seem to be, will themselves effectively project a definition of the situation by virtue of their response to the individual and by virtue of any lines of action they initiate to him" (Goffman 1990:20).

The definition of the situation which results is not usually an ideal consensus or harmony. Even the situation co-defined by the two managers may, although superficially comfortable, belie deep-seated rivalry or resentment between the two individuals. In the situation where the office manager is confronted by the rainforest tribesman, the discomfort for both individuals would be both open and a showstopper. The definition of the situation which results from the meeting of people's fronts and individual performances is more usually one in which each participant has suppressed how s/he really feels, preferring to "assert values to which everyone present feels obliged to give lip service," resulting in a "surface of agreement... [a] working consensus" (Goffman 1990:20). For example, the level of tension, or stress, in any given situation, might be said to be directly related to the ease or strain of the working consensus in play. The two office managers maintain a superficial camaraderie under the gaze of their subordinates. The office manager visited by the tribesman probably calls in Security to force a definition on what is otherwise a very unsettling situation for him indeed.

'Working consensus', in fact, is not far short of 'crowd mentality'. It is the foundation, even, of culture itself. Cultural Performance, which we shall examine in detail in the context of the Modernist project in the next chapter, is quite literally made
up of it – a great constantly shifting interlocking web of such working consensuses that collectively constitute Culture. We 'behave' – perform – as the cast of characters in the stories that define and represent our cultures, playing now this role, now another, as we move from situation to situation. Cultural values, invariably, are defined in terms of behaviour – in terms that proscribe or prescribe our performances. Values are the rules that make up a working consensus.

Shared or common values, and pre-defined situations, are, at the very least, being paid lip service to, and often unconsciously adhered to, by everyone, in the creation of day-to-day working consensus, and thereby, inevitably, at times, we will, as Goffman asserts, "give a well-designed impression of a particular kind.. [though we].. may be neither consciously nor unconsciously disposed to create such an impression." (Goffman 1990:18).

The social scenography of the individual, as defined earlier, includes the 'front' given off by our gender. Even here, there are many who pay more than lip service to the working consensus. Anyone who has been in, or known someone who is or has been in 'the closet,' will understand how an entire lifestyle can be constructed for the sake of the working consensus (Sedgwick 1991). Gender, indeed, as we shall see, proves to be a particularly powerful pre-defined situation, a particularly constitutive scenographic setting within whose set boundaries most of us unconsciously play out our lives, performing the roles allotted to us, but which, on close inspection, turns out to be from a certain perspective no less historically contingent and culturally performative than our clothes. Those whose real feelings do not fit easily into the grooves of gender set by a particular culture are perhaps to be regarded as pioneers in re-defining social situations at this profound level.
II) The Self

The question of belief in the role that one is playing is thereby of particular importance. Whilst being "not oneself", yet remaining "not not oneself", the conviction with which one becomes "not oneself" for the benefit of the working consensus can be critical. At the two extremes are the performer who is completely taken in by his/her own act, the sincere actor for whom the reality of the social scenography is all the reality that there is, and at the other extreme the more cynical performer who is not taken in at all by his/her own routine, for whom the social scenography is only skin deep. There is often travel between these poles, for example from disbelief to belief, wherein the insecure social actor comes to know him/herself through performing her role, and develops into a Person (of which more in a moment). In the opposite direction, the performer acting a role s/he deems important and responsible, can over time lose his/her passion for the task and grow, finally, cynical behind the mask s/he nonetheless maintains.

For Goffman, this 'inner' Person – the actor – is not some pre-existing Individual Subject to which the Objective world is represented. The actor of the many roles of the working consensus is on the contrary a by-product of such role-playing. To take part in defining the situation is to develop a level of conviction or doubt in the working consensus, and thereby to develop a personality. This 'coming to know oneself' through the playing out of roles within the confines of the working consensus, and developing thereby into a 'Person' is perhaps the central concept in Goffman's standpoint. He quotes from Robert Ezra Park:

"It is probably no mere historical accident that the word person, in its first meaning, is a mask. It is rather a recognition of the fact that everyone is always and everywhere, more or less consciously, playing a role...It is in these roles that we know each other; it is in these roles that we know ourselves. In a sense, and in so far as this mask represents the conception we have formed of ourselves - the role we are striving to live up to - this mask is our truer self.
the self we would like to be. In the end, our conception of our role becomes second nature and an integral part of our personality. We come into the world as individuals, achieve character, and become persons." (Goffman 1990:30)

What we have here is a definition of the Self which asserts not merely that it is constituted and shaped by the performance of roles, but that "a correctly staged and performed scene leads an audience to impute a self to a performed character," and this self "is a product of a scene that comes off, and is not the cause of it." (Goffman 1990:245) In other words, the process of interaction defines the performance that defines the self.

"The self... as a performed character, is not an organic thing that has a specific location, whose fundamental fate is to be born, to mature, and to die; it is a dramatic effect arising diffusely from a scene that is presented, and the characteristic issue, the crucial concern, is whether it will be credited or discredited." (Goffman 1990:245)

When someone volunteers to do something, claiming that they 'have to,' it is because in order to maintain the integrity of the overall role they are playing, in order to avoid being discredited as a fraud, they must do it: it is part of the role. The implications of this redefinition of the self for the "New Constitution" we discussed in the first chapter are fascinating. The "credible, trustworthy, well-to-do witnesses" who have been leading - between scientific revolutions - the discursive formations of the modern world turn out not to be quite so credible or trustworthy after all. They are performers whose performances define them, who in turn define the social context of our lives.

ii. Presentation of Roles

The presentation of Self, then, is about performing characters whose lines are written largely by the social situations in which we find ourselves. The process of interaction defines the performance that defines the Self. The presentation of these roles in our interactions with each other, moreover, is something that the roles themselves
most often prescribe. The most fundamental of these roles – our genders - have been the focus of recent attention by the group of thinkers known as the post-feminists, most prominent among whom is Judith Butler, who we have introduced, and whose work we will now examine in more depth.

Butler asks questions such as: does one have, or must one be, a gender? Is gender a given, that comes with our bodies, or is it as much a social construction, as much a given part of the social scenography, as our individualities? If gender is a social construction, part of the successful scene by which a self may be imputed to us, are we free to wear our genders like sets of clothes, perhaps even changing and rearranging as we see fit, or are there forms of social determinism which close in upon us and restrict such movement?

Crucially, where in all this does the body, the 'clothes-horse' upon which our genders are inscribed, and within which our identities are said to reside, take on its meaning? If our Selves are indeed not 'located' in the body, but are constituted as dramatic effects of our interaction with the world, how much of these Selves is defined by the 'personal front' given off by the marks of our gender?

I) Performativity

Judith Butler and many of the other post-feminists have embraced and helped to define a theoretical standpoint, an ontology, which continues theoretical use of the theatrical metaphor we have already seen in Goffman. Performativity, as it is known, arose originally from the study of language. As Elin Diamond describes in the introduction to her book, Performance and Cultural Politics, "Performativity derives from J.L. Austin's concept of the performative utterance which does not refer to an extra-linguistic reality but rather enacts or produces that to which it refers" (Diamond 1996:4). Austin distinguishes between illocutionary and perlocutionary speech acts, the former doing what they say in the saying of them, the latter producing certain effects as a result.
of being said. The concept, in short, suggests that, at least with reference to some cultural realities, 'doing' pre-exists 'being,' and that being, moreover, is something that only exists in the 'doing' of it. The implications of this are profoundly anti-essentialist, putting aside once and for all the notion of an 'essential' self inside the body, guiding and directing one's actions. Yet it goes further than constructionism, too. It says not merely that our selves are the product of social construction, but, specifically with reference to gender, "It's not just that gender is culturally determined and historically contingent, but rather that "it" doesn't exist unless it's being done" (Diamond 1996:4). Gender is an activity, not an attribute.

The theatrical metaphor behind performativity as a concept useful for cultural theorizing reveals its real depth in the acknowledgement that each doing is a repetition, a reiteration, a well-rehearsed enunciation of something already written as a cultural code. In short, the social actor is performing "restored behaviour" in everything s/he does. The "act one does, the act that one performs is, in a sense, an act that has been going on before one arrived on the scene" (Diamond 1996:4-5). Gender is both a doing and a thing done - a pre-existing category and a pre-defined situation, a “restored behaviour” that remembers and re-enacts the doing of a gender construct set deep within the ethos of a culture whose social scenographies we adopt to achieve working consensus in the definition of the situations in which we find ourselves. Deeper still than Goffman's shared or common values, the working consensus that imputes a gender to the social actor defines for that performer the bedrock of his/her selfhood.

But it is perhaps important to note, here, that the concept of the performative utterance includes within it the notion of failure - that a great deal of what is uttered in a performative manner, fails to enact what it says. Without this element of failure, the negotiation and play-off integral to working consensus would be impossible. So, too, would those whose real feelings do not fit easily into the grooves of gender roles be prevented from their pioneering in re-defining social situations at this profound level.
Performativity, then, describes a gender constructivism that entails the performed repetition of gender codes, as stipulated by cultural norms, and strips these codes of the very bodily substance they attempt to signify, reducing them literally to codes, whose very existence depends upon their repetition by the performers who are themselves defined by them. It is important to note here, though, that these codes, unlike some unsubstantiated free-floating cybernetic information, are not to be considered as in any way existing outside of or beyond their very real instantiation as gender signifiers. The point here is that these codes are actions. Gender is a role presented.

This in turn reflects upon the nature of the "I" that clearly neither 'has' nor 'is' but does gender. As Butler says, "In the sense that the 'I' has no interior secure ego or core identity, 'I' must always enunciate itself: there is only performance of a self, not an external representation of an interior truth" (Butler 1993:12). Freud's argument that "the ego is first and foremost a bodily ego," (Butler 1993:13) is of note here. As Butler takes it up, it is an 'imaginary morphology,' a body image of self which is the lived body, as opposed to the physical body. This morphologising takes place very early on - indeed the 'sexing' of the body at birth is the first step in the process, and every step thereafter is a reiteration of the norms of sex.

The construction of the individual, in short, is a continuous, interpenetrative, and never-culminating process. But where does all this lead? Butler analyses the limits of constructivism as a concept - how it is prone to fall either into a linguistic monism, "whereby everything is only and always language," (Butler 1993:6) or into places where construction requires the agency of a constructor, viz 'If gender is constructed, then who is doing the constructing?' Her proposal is to return to the notion of matter, which she re­defines as "a process of materialization that stabilizes over time to produce the effect of boundary, fixity, and surface we call matter." This is very reminiscent of Bergson's durée réelle. If matter is a process of materialisation that produces only the effect of boundary or fixity then it is time that is fore grounded, not space, in this definition. Thus time
ceases to be a fourth dimension through which matter travels, and matter becomes the unfoldment of process – something which the quantum physicists have also underlined.

The body, in Butler’s analysis, is marked off through a process of erasing, of selectivity, which, through persistent reiteration, becomes a boundary that is defined rather by what it is not, than by what it is. The process of reiteration – a time based unfoldment of matter – is what defines these boundaries. As Butler asserts, "there is no reference to a pure body which is not at the same time a further formation of that body" (Butler 1993:10). The sexing of the body - the very first act of life beyond (and even within) the womb - is also the delimiting of possibilities, the stamp of conformity. As Butler asserts, "To 'concede' the undeniability of 'sex' or its 'materiality' is always to concede some version of 'sex,' some formation of 'materiality.'"

We are dealing here, at root, with the relationship between language and the body. As Felman puts it,

"If the problem of the human act consists in the relation between language and the body, it is because the act is conceived - by performative analysis as well as by psychoanalysis - as that which problematises at one and the same time the separation and opposition between the two. The act, an enigmatic and problematic production of the speaking body, destroys from its inception the metaphysical dichotomy between the domain of the 'mental' and the domain of the 'physical,' breaks down the opposition between body and spirit, between matter and language." (Felman, Shoshona, The Literary Speech Act tr. Catherine Porter, (Butler 1997:10)

For, of course, the performance of the self, the act of speaking, the 'substance' of language, is the movement of the body, the physical, grounded production of visual signals picked up by physical eyes, and auditory signals picked up by physical ears. To speak is to move one's vocal cords, one's lungs, one's lips and tongue. Language is, at its inception, a physical act, which, immediately it is loosed into the social sphere, becomes something other, some field in which our very physicality - our genders, age,
racial characteristics and all the other elements of personal front - becomes defined not only for those around us but thereby, reciprocally, for ourselves. A new, morphologised body, the lived body of which we are aware, comes rushing back to hide from us the physical body from whose lips our words were loosed, defining for us what that body is, and who, thereby, we are.

Here in a nutshell we have something so strikingly similar as almost to be the twin of Bergson's intuitive self folding back in upon itself as its intellect seeks to pin it down, to fix it in terms that can be understood.

The social-defining-person-defining-social reciprocal process, though it occurs in the field of language, takes up and brings our bodies with it: social-defining-body-defining-social.

II) Citation

To what degree, then, if there is no 'I' behind that which 'I' perform, and if my performance is necessarily a repetition and reiteration of norms and formations that have gone before - to what extent can identity be said to exist at all? Where in this performance can we find agency? Is it indeed necessary to have the power of a Will for a 'performative utterance' to enact or produce that to which it refers, literally to name a phenomenon into being?

Derrida suggests that a performative utterance can only work if it repeats a coded or iterable utterance, "or in other words... the formula I pronounce in order to open a meeting, launch a ship or a marriage," will succeed only to the degree that it is identifiable in some way as a "citation".(Butler 1993:13) This is Foucault's unit of discourse, the statement, a serious speech act that gains its power from the context and from the degree to which the speaker may be regarded as a "credible, trustworthy, well-to-do witness". The category of intention does not disappear, but it no longer commands the "entire scene and system of utterance." Butler takes this concept of citation as a
reformulation of performativity, suggesting that our performances of sets of norms are perhaps better understood as citing the norms. The 'imaginary morphology' becomes a body image of self that in itself is a citation of the norms of sex that gain their power as normative codes by that very citation. What we are seeing here is Hayles' reflexivity in action. And this returns us again to Nietzsche, particularly in his critique of the notion of God: "The power attributed to this prior and ideal power is derived and deflected from the attribution itself" (Butler 1993:20).

Performativity, as citationality, elucidates for us a picture of an Identity morphologised, sexed and gendered by the interweaving of the many sets of norms and cultural codes of a particular time, into which it grows and which its existence is a citing of, a reiteration of. The very citing, the very reiteration and performance of these norms and codes is, furthermore, at the same time, the source of their power.

III) Cyborgs and Gender

It is pertinent to note, at this point, that the cultural figure of the Cyborg, sitting neatly as it does at the nexus of so many boundary transgressions, naturally lends itself, Haraway believes, to a feminist agenda. If social reality is to be considered as "lived social relations," then, as she insists, "The international women's movements have constructed 'women's experience', as well as uncovered or discovered this crucial collective object." As we shall see from our discussions of Butler in a moment, this is in essence true. "This experience is a fiction and fact of the most crucial, political kind. Liberation rests on the construction of the consciousness, the imaginative apprehension, of oppression, and so of possibility. The cyborg is a matter of fiction and lived experience that changes what counts as women's experience in the late twentieth century. This is a struggle over life and death, but the boundary between science fiction and social reality is an optical illusion" (Haraway 1991:149). But Molly Millions, in the Gibson books, arguably the most complete cyborg in the Neuromantic world, with her
artificial eyes and her razor-sharp claws, is a creature of man's world. The robot Maria Klein, in Lang's nightmare, is little more than a tool.

Of course, the contemporary cyborg, as Butler insists, and as Haraway acknowledges, "is a creature in a post-gender world" (Haraway 1991:150). But most tellingly, and where this author feels Haraway really misses the point, she asserts that "The cyborg has no origin story in the Western sense" (Haraway 1991:151) as if the Golem was not a quintessentially Western origin story. Haraway claims this lack of origin story as "a 'final' irony since the cyborg is also the awful apocalyptic telos of the 'West's' escalating domination of abstract individualism, an ultimate self untied at last from all dependency, a man in space" (Haraway 1991:151). It is my contention that this 'man in space' and its origin story are inextricably linked, and that Haraway here is somewhat fixated upon primogeniture.

Her suggestion that the cyborg is somehow an illegitimate son, and that this illegitimacy allows for some hope that the cyborg might escape its "teleology as star wars" strikes me more as clutching at straws than sound analysis. The cyborg, to my eyes, not only does not "skip the step" of the myth of original unity in Western humanism, but represents a return, a coming full circle to the unity from which it sprang. The process of distancing from nature toward the abstract enacts, in the figure of the cyborg, an attempt to return to nature, to return to the body. That this return is both invasive and disturbing is testimony to the distance the process of abstraction has gone, before turning upon its origin.

Haraway's true 70s radical feminist colours are betrayed in her acknowledgement that "cyborgs, [are] of course, ... the illegitimate offspring of militarism and patriarchal capitalism, not to mention state socialism. But illegitimate offspring are often exceedingly unfaithful to their origins. Their fathers, after all, are inessential" (Haraway 1991:151). Leaving aside illegitimacy, inessential fathers, and the very Western origins she just denied, Haraway's point about militarism and capitalism goes to the core of this
thesis. The cyborg is a product of the military-industrial complex, and of the mindset of modern scientific exploration funded by defence budgets and by the ubiquitous profit motive.

iii. Presentation of Status

I) Foucault's “statements”

So, with Goffman, we have seen how the presentation of self is a performance, comprising a definition of a situation and a working consensus. With Butler we have seen how the presentation of roles is a process of citing pre-existing norms in reaching this consensus. How, then, in social situations, does this citationality give us status? For this, we must turn to Foucault.

Foucault's units of discourse, "statements," are performances that, to use the terminology of Austin and Searle (Foucault 1995:45-6) could be described as "serious speech acts" (Foucault 1995:48) - for example, the statement, "It is going to rain," becomes a serious speech act when it is spoken by the Weatherman. The statement is therefore like something that can be cited - it carries weight, like the proper formula to open a meeting, but is not distinct from the status of its speaker. When the Chairman of the Board utters this statement, the meeting is open. When the tea-lady utters it, everyone laughs. This is because the 'truth game', or "enunciative field," (Foucault 1995:109) in which the formula is placed requires that it be uttered only by an authorized subject, for it to be 'true'. An authorized subject, of course, in its scientific formulation, was none other than the "credible, trustworthy, well-to-do" witness of Boyle's laboratory experiments, the Calvinist merchant-father of the Individual Subject and the Modern world.

Most importantly, it is their place in the network of other serious speech acts, and nothing more, which gives speech acts their seriousness, and thus makes them statements. The so-called 'unity' of the group figures such as psychology, economics,
grammar, medicine etc., Foucault questions at this level, preferring to label them as
groups of statements he calls 'discursive formations.' It is the discursive formation in
which a statement, as a serious speech act, gains its seriousness. A formation,
moreover, is not simply the sum of all the statements within it. Nor has the formation
determined its contents from all the possible statements it might contain. The discursive
formation determines what can count, even, as a possible element. The whole verbal
context is more fundamental than its elements, and thus is more than the sum of its
parts. Indeed there are no parts except within the field which identifies and individuates
them." (Dreyfuss 1983:55) This is archaeological holism. It characterizes the sciences
and varied academic disciplines of the past several hundred years as self-perpetuating
intellectual constructs that gain their verity from within. They are true because they say
they are.

The discursive formation is, because of this holism, immune to abstraction - one
cannot say that all discursive formations are structured in this or that way, because "the
rules governing the system of statements are nothing but the ways the statements are
actually related." (Dreyfuss 1983:55) The supposed unities of the human sciences
Foucault maintains fail even on their own terms. "He observes that there is no essential
characteristic of any discipline defined in the traditional way that remains the same
through change." (Dreyfuss 1983:59) One cannot find abstract laws governing
formations; one can only describe specific rules of transformation, by which these
formations change over time.

This discursive history knocks yet another nail in the coffin of the New
Constitution. It shows how the power of "credible, trustworthy, well-to-do witnesses"
can quite literally create entire disciplines of thought seemingly out of thin air, merely by
gathering together and supporting each other and coming to an agreement on a common
strategy to maintain their hegemony.
b. Actor Networks

In this second section of this chapter on Performativity we shall first introduce, and then present an original modification to Actor Network Theory (ANT). Using the work of Bruno Latour and John Law we will sketch out the basic tenets of ANT, with particular focus on the politics of artefacts. We shall then lay out the theoretical synthesis behind the notion of performative actants, through an examination of examples presented from the field of disability studies, and through a discussion of 'cyborgian' enhancing technologies.

i. The heterogeneous networks of things and people

The power of the role of shopkeeper – the Puritan capitalist - defined the situation wherever it went, absorbing new individuals into its discursive practices at every opportunity. Crossing the Foucauldian 'formalisational' threshold (Foucault 1995; Foucault 1997) it finally came to define reality for the vast majority of people in the Western world, resulting in Augusto Boal's 20th century attempt – in the Theatre of the Oppressed - to present us with the possibility of escape.

Belief in one's role, let us not forget, as Goffman emphasised, is not a given, but highly contingent. In a society where normative behaviour is to act like a shopkeeper, in which those ill-suited to the role find themselves forced into taking a McJob of one kind or another by governmental institutions, escapism becomes extremely important - as the huge retail trade in escapism testifies.

The demarcated worlds of Nature and Culture have, of course, enabled us throughout this period to ignore how the goods mobilised by the new roles performed by the Puritan capitalist have defined and underpinned our societies. But it is unquestionable that these goods – particularly technological artefacts – carry with them the politics of their makers.
The creation of the cyborg in the worlds of science and technology that emerged from the Industrial Society set up by the Puritans cannot be regarded as an isolated event, not even connected solely to the defence departments of world governments. The Machine of modernist society, with its objective reality represented to its humanist subjects, is a construct with its own internal workings, its own inevitabilities. With the onset of the Industrial Society of the nineteenth century, new rules came into play in human intercourse, whose importance had until this time been minimal, but which now began to shape society in profound and encompassing ways. These rules are summed up in the concept of technological enframement (MacKenzie and Wajcman 1992:3). To quickly grasp this concept, one need only think of the ubiquity of the electricity grid in modern society, which is only obvious when there is a power cut. In short, technologies add on to each other - every electrical appliance is a side-bet on the continuation of the electricity grid - and like a scrabble game, the parameters for each new innovation become more and more constrained as the board fills up, and the options for change become more and more contingent.

As Bijker and Law state, "Technologies do not...evolve under the impetus of some necessary inner technological or scientific logic. They are not possessed of an inherent momentum. If they evolve or change, it is because they have been pressed into that shape." (Bijker and Law 1992:3) Technologies evolve according to a range of contingencies. New technologies are the result of conflict between different interest groups who determine their final shape. The merchant-fathers of the capitalist system that spawned Industrial Society, as we have seen, conduct their lives at arms length from one another, continually calculating self-interest. Strategies are employed by different groups of them to try to achieve what each wants. Technologies only stabilise when "the heterogeneous relations in which they are implicated, and of which they form a part, are themselves stabilised." (Bijker and Law 1992:9) Above all, both the strategies and the consequences of these processes in totality, are emergent, that is, they are continually
the result of changing circumstances. It continues, in short, to be the Puritan merchant
fathers who overthrew Catholicism and populated Parliament and the Market Place, who
today haggle amongst one another until the calculation of self-interest has settled a deal,
by which new technologies come into being. Public and Private Finance shuffled by the
same people.

Moreover, as Bruno Latour describes, even so simple a device as a door closer
can become implicated, to the critical eye, in prescriptive discrimination. (Latour 1988) If
it goes too fast it privileges local users, who get used to it, over disabled/old/new users
who find it troublesome. Every artefact has some human will placed into it. A policeman
at a junction is replaced by an artefact that mediates his intention so that he need not be
physically present. The traffic light, as an artefact, contains the programme: control the
traffic at this junction. But because there isn't a real human being there anymore, people
just drive through when they think they can. The anti-programme in the 'users' of the
artefact is to cheat the programme in the artefact. So the police authorities install a
camera that watches the traffic light and snap you if you break the programme.

Every artefact has such a programme in it, or more accurately, an artefact is only
part of a programme of action. Such a programme, moreover, is to a greater or lesser
extent, overtly or covertly, a political act. The architect Moses who designed much of
New York's infrastructure built the rail bridges all around Central Park deliberately too low
for the double-decker buses to pass under. The (mainly black) urban poor, who would
use the buses, were thus excluded from the Park. "Science and technology are not
politics. [But] they are politics by other means." (Latour 1988)

II) Heterogeneous networks and the process of innovation

So as we arrive in the 21st century, the rationalist, mechanistic, capitalist,
humanist credo embarked upon in the mid-17th century is without question dominant, all
other views of life either politely hidden in western academies or if elsewhere being
bombed into submission. The vast military-industrial complex of the western world has become like one huge machine. Can it be, as our analysis so far might suggest, that we, carefully and strictly organised into the discursive practices of the shopkeeper, are bound into that machine in everything we do, and everything we are? To the extent, as Butler tells us, that we are what we do, have we become cogs in that machine, soldiers in the military-industrial complex? Has the post-puritan stranglehold on the social scenography of our lives become so complete that we barely even notice it?

One of the most telling outcomes of Latour's work has been the evolution of Actor-Network-Theory (ANT) which, with Hayles, understands the impossibility of such a disjuncture as that between matter and information, and understands scientific knowledge as something which by definition is always instantiated. As John Law eloquently describes it:

I put "knowledge" in inverted commas because it always takes material forms. It comes as talk, or conference presentations. Or it appears in papers, preprints or patents. Or again, it appears in the form of skills embodied in scientists and technicians (Latour and Woolgar, 1979). "Knowledge", then, is embodied in a variety of material forms. But where does it come from? The actor-network answer is that it is the end product of a lot of hard work in which heterogeneous bits and pieces -- test tubes, reagents, organisms, skilled hands, scanning electron microscopes, radiation monitors, other scientists, articles, computer terminals, and all the rest -- that would like to make off on their own are juxtaposed into a patterned network which overcomes their resistance. In short, it is a material matter but also a matter of organising and ordering those materials. So this is the actor-network diagnosis of science: that it is a process of "heterogeneous engineering" in which bits and pieces from the social, the technical, the conceptual and the textual are fitted together, and so converted (or "translated") into a set of equally heterogeneous scientific products (Law 1992).

Of course, for the actor-network theorist, it is not just science, but "the family, the organisation, computing systems, the economy and technologies - all of social life - [that] may be similarly pictured," which leads to the inevitable conclusion that in fact
"the social is nothing other than patterned networks of heterogeneous materials." (Law 1992) That is to say, contrary to the Hobbesian assertion of the collective of Individual Subjects' exclusive control over society, these networks are composed "not only of people, but also of machines, animals, texts, money, architectures" - all the Things mobilised by society to give it stability and enable it to endure. Latour's multiple hybrids proliferating in the non-space between the moderns' falsely demarcated Nature and Culture, then, are in reality the networks of human and non-human actors who collectively make up the social world of which we are but a part. Almost all of our communication is mediated by some material object of one kind or another. Basically, as Law sums up, "If human beings form a social network it is not because they interact with other human beings. It is because they interact with human beings and endless other materials too." (Law 1992) (my emphasis).

ii. Performative actants

It is the contention of this thesis that Butler's performative conception of human being and doing must therefore be extended to embrace the "other materials" if we are to gain a truly comprehensive picture of how the social works. Drawing in the programmes in the artefacts discussed earlier, we must see that the machines, animals, texts, money, architectures and so on that are an integral part of the networks of the social must also be impacting upon what those networks 'translate' into, be they heterogeneous scientific products, the family, the organisation, computing systems, the economy - and not simply in the manner of their utility, or that they "prefer to interact in certain ways." As ANT insists, it is not the case that in the end human preferences will dominate over material preferences, nor vice versa, but that the heterogeneous mixture of all those preferences together will combine to produce the final 'translation.' As Law states, "what counts as a person is an effect generated by a network of heterogeneous, interacting, materials." (Law 1992) It is the 'definition of the situation', as Goffman (Goffman 1990) might put it, that counts, and the 'performances' of materials in the
network are no less important than those of the people in that network in that definition. Further - the act of defining a situation is in itself a heterogeneous network involving "other materials" and thus any working consensus includes all the multifarious side-effects and influences of the material elements of the combined 'fronts' of the individuals in the interaction.

But if things as well as people in the intricate web of relations that goes to make up this network are performatively influencing the definition of situations, the working consensuses by which we come to know ourselves, then, as are we, so must they be citing what they perform: a tailor-made sharply-creased pinstripe suit cites the image and social influence of a city financier effectively when the person inside it talks about million-dollar deals. Its citing of that personality profile does not 'come off' if the person inside it asks you if you have any spare change. The 'statement' in the discursive formation of clothing made by the pinstripe suit is of course wholly contingent, entirely interwoven within the heterogeneous context of sheep, hill-farming practices, cloth manufacturing machinery and the multiple paraphernalia of retail trade, and the social status which it imputes carries with it entire economies of heterogeneous materials in the implied relations between rich and poor. For the makers of the suit - not least the sheep themselves from which the wool is shorn - it is imperative that it continues to cite the image of wealth and power which it has accrued. Further, the body that it contains must display the correct 'bearing' for the citation to be successful. The bodily performance implicit in that bearing must constrain that body from the easy louche stance of a carefree teenager, for example. The set of the jaw must be 'just so' in order to carry the correct mixture of adrenalin-fired determination, cold calculation, and world-beating confidence. This is not to impute the character of the financier to the suit, but to remind ourselves that the character does not exist without it any more than the suit can go share-dealing on its own. If a suit can carry - and cite - so much material, political and social significance then how much more so a bus, or a Lear jet; an underground railway network? The ANT theorists' network 'unit', embracing both people and things, is called
an 'actant.' We might, then, describe the world of the 21st century as a network of performative actants.

In the following sections we will test this notion in two separate but related social locations: the world of disabled people and the enabling technology they use and how it might develop in the future; and the world of consumer society at large, focused as it is upon the social significance of objects, and the enhancement of our lives that it promises.

I) Enabling technology?

(A) Social barriers

Performative thing-actants – things that have an equal say in who we are, as we do, are everywhere apparent, but nowhere more thoroughly, perhaps, than in the world of disability, which we may regard as exemplary. Perhaps the most personal and immediate experience of the contemporary phenomenon of cyborgism is precisely that of disabled people. Moreover, it is, this author would argue, over the performative influence upon their lives of enabling technologies and disabling infrastructures that the political battles of the disability rights movement are being fought. These performative thing-actants in the networks of their lives are making decisions about their identities that the people-actants themselves are contesting.

On the face of it, advances in enabling technology for disabled people are a self-evident good, and can only be praised. However, looked at more closely, this is a much more complex area than it at first appears. Specifically, there are two issues concerning enabling technology that question whether it is so much of a good at all: firstly, the question of access, and its location, suggesting that enabling technology is something that should be applied to society, rather than to the individual (Hales 1996); and then following on from this issue, from the perspective of Foucault, how the medicalisation of disabled people by society can itself be viewed as disabling (Foucault 1994; Foucault 1995). From an examination of these two issues, we shall see how in the network of

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people and things for disabled people – and by implication, all of us – the thing-actants are not only as performative and citational as the people-actants, but seem in this sector of society at least to have got the upper hand.

The fundamental difference in approach being focused upon with regard to disability is between what is known as the "deficit model," which views disabled people as 'lacking', or 'falling short' of a 'norm' below which one is not easily able to engage fully in society, and the "social barriers" model of disability, which questions this 'norm' and regards full engagement in society as something around which barriers have been built up, barriers which disable some people, preventing such full engagement, singling out a group of people within society for special discriminatory treatment (Roulstone 1998).

The 'social barriers' model has been adopted widely by the disability rights movement, and increasingly by government authorities. There is much movement in the higher echelons of the political world towards redressing the problem of social barriers. The EU, for example, has made 2003 a European Year of Disabled People, and earmarked 12million Euros to do something about it. Not much, perhaps, but a start, at least.

"About 38 million Europeans - 10% of the populace - have a disability. Despite some progress to date, they still face numerous barriers throughout the EU in finding accessible transportation, getting into buildings and facilities or gaining access to school and work. Eurobarometer Survey 54, conducted in January among a sample of over 16,000, shows that nearly all Europeans are aware of this reality and believe that community access and participation remain very difficult for people with disabilities. This is despite the fact that 60% say they know one or more disabled individuals, with a quarter of these identifying the acquaintance (s) as family members."(EU 2001)

In the UK, the Disability Discrimination (Amendment) Bill, that will align the Disability Discrimination Act 1995 (DDA) with the EU equal treatment framework directive, has recently received its first reading in the House of Lords.
The social barriers model of disability, for Ju Gosling, is key to an understanding of why the 'disabled' experience is exemplary. That 'group', to which she belongs, is an almost arbitrarily, socially defined group, where the line that is drawn between disabled and non-disabled is contingent, shifting. For Ju, we are all, in fact, at best 'Temporarily Able Bodied' (T.A.B.s in the American idiom.)

Ju: ... you can't actually look at a disabled body and a non-disabled body in a social model way, because I do very much believe that all of us have not only got strengths and weaknesses - whether that's intellectual or physical - you know, I don't know how you'd describe mental health in there, perhaps emotional - but also they're very much variable over a lifetime.

Beyond this, of course, there is also the impact of how "temperature affects our movement, environment affects our movement, fear, confidence," all of these things affect our movement. So even given that underlying physical abilities were the same, one's ability to perform can still be very different according to where one is. Then of course, as Ju continues, "you've got the whole sort of socio-economic factors to bring into it"

Indeed the heterogeneous networks of things and people in our society enable and disable every one of us at given times and in given situations. As children and as the aged, we are 'disabled.' When we are sick, or have broken a limb, we are 'disabled.' When northern Europeans try to operate normally in the Sahara they are 'disabled'. The poor are 'disabled.' Ultimately, as Ju shows in her very personal example, the very identities which we perform enable and disable us in different ways, in different situations in our society. Ju has a part-time helper, Roy, who works around the house for her, assisting her with day to day tasks. But as Ju says: "Germaine Greer pointed out to me a couple of years ago, most men, most married men never do their own shopping anyway". So why, in Ju's mind, does she have a different value system, because her helper is cleaning her bath or doing her shopping, to someone else in our
society who is physically capable of doing it but not only would not do it but wouldn't even think of it as part of their role. Is Ju "limited in what I can do because I'm a woman? Or am I limited in what I can do because I'm disabled?"

Here, the social implications of Ju's impairment and of her gender are cross-linked and the distinction seems to fall down. Is her true impairment some sort of inability to fulfil the expected role of woman? As Ju says, what is at stake, in the end, is "independent control". The 'disabled', as a group, quite clearly live right at the crux of the non-space between Culture and Nature where Latour's hybrids proliferate, right at the nexus where Law's heterogeneous networks of human and non-human actants most perfectly interact. Here, where the medical establishment impacts directly upon the bodies and lives of members of society is the very quintessence of cyborgism, as this author reads it. Here both things and people become part of the network of factors through which the two categories are at first distinguished, and through which 'the disabled' become 'enabled.' The most crucial and critical question at this nexus, this focal point of the network, is about whether the thing-actants or the people-actants, ultimately, call the shots. Does the 'citizen' have exclusive say in his/her life, or in the hybridised world of networks do the objects with which we mobilise society ultimately make decisions for us?

Ju: It's about independence and control, and as long as I have control over how my life is run it doesn't actually physically matter whether I'm doing it or I'm using technology to do it, or using another person to do it.

Here the Thing, and the Person (playing the required role), are both just parts of a network necessary for the achievement of the aim. This is known as the "independent living model", which states that "somebody who uses a wheelchair all of the time, needs 24hr support, needs help to be fed, to undress, can still be a perfectly independent person, as long as they've got control" - and the crucial question is control. It's difficult
to know what the difference is between cleaning by using a Hoover, and getting someone else to be operating the Hoover. It's a role like any other.

People performing roles in this scenario are part of a network of relations between Things and People that directly impact upon the identity of the disabled person. These roles and scenarios, moreover, are very contingent. The historically contingent nature of the boundaries between 'able-bodied' and 'disabled' people is underlined starkly by this very question of "getting someone else" to use the Hoover. In this country up until 50 years ago middle class people employed people - to do the hoovering. But 50 years ago it was a high status thing, to have somebody else doing your shopping and cleaning.
(B) The Perfect Body

Nor is it just the historical contingency - but the economic and demographic contingency as well: here in the fourth richest country in the world, Ju has a reasonable standard of living, and access to a range of enabling technologies. She can do a lot of things that somebody else, demographically and economically less fortunate, who isn't in pain, can't do. Who, then, is disabled?

This contingency calls into question the very nature of what it means to be 'able-bodied.' Ultimately, the notion of the 'able-bodied' human being is itself something to which we not only all of us aspire, against which all of us are measured as a benchmark, and in the shadow of which many of us are made to feel inadequate, but it is also a notion which is largely a fiction created and maintained by the very medical world which we rely upon to bridge the gap for us between what our real human capabilities add up to and the unattainable ideal they invented.

Ju: - it's then coming back to saying well - is there this sort of pure perfect human being, that everybody else is measured against? It's one of the major problems with -certainly Western - culture. I really don't know outside western culture, but 19th and 20th century Western Culture still harks back to - I don't know was it Plato's idea of this perfect human being? And you can understand in a world that kind of pre-dated anatomy and physiology and medical science, why you could believe that, but now we know that every human being is unique, and that nobody actually fits into this kind of pattern. But it's such a nonsense, that we still kind of have this belief in it. And like I said when you start breaking it down and saying okay well you know if you have the perfect body but nobody is perfect, how can you distinguish between disabled and non-disabled? Because we're all imperfect....

If you can pass yourself off as the Ideal Body, in our culture, you can get to the top of the pile. The myth of the Perfect or Ideal Body is a corollary to the infallibility of science. The strange thing is that both ideas are very undermining to us, because none of us has the Perfect Body, and it is science more than anything else that has proven this
to us. We cling to this idea that demeans us, as if to let go of it would allow a whole house of cards to fall....

**(C) The Wheelchair**

The interview with Ju90 included a discussion of the nature and role of the wheelchair, and its use by members of our society, and this author was struck by how powerful a social thing-actant the wheelchair really is. Its performative power over the identities of those for whom it 'defines the situation' before they have even arrived is strikingly real. Most people who use wheelchairs, like Ju Gosling, don't use them full time, they use them to make life easier. But many people for whom wheelchairs would be helpful don't use them because of the stigma: the notion of being 'confined' to a wheelchair. Ju relates a story about a Guardian article about the disabled athlete Flora Thompson, which described how she was "forced" into a wheelchair at an early age. Ju laughs, "you can imagine her parents, with a whip, you know like tennis parents 'Get to that wheelchair! because we want to see you as a wheelchair athlete by the age of 19.'"

More seriously Ju believes disabled people are envisaged as cyborgs when in a wheelchair. People who use wheelchairs, of course, do not need them all the time – even within the home. But the descriptions and the language associated with wheelchair users make it difficult to distinguish between the person and the wheelchair. Disabled people who use wheelchairs "get very angry at the way they will be described as 'the wheelchair'," rather than "'the wheelchair user' – and some of that is just appallingly bad language use and some of it [is] disabled people actually being seen as inseparable from their technology." Cyborgs, Ju argues, "are supposed to have high status, and yet in actuality as soon as you're kind of seen as inseparable from your technology you're given a low status."
Wheelchairs, of course, are not the only technological artefacts associated with various ‘disabilities.’ Enabling technologies are prey to fashions, to a whole range of different social connotations, and thereby inextricably bound up with the self-image of those who use them. In the case of the wheelchair, to be ‘disabled’ by such an ‘enabling’ technology one has to conceive of ‘disability’ as a social thing. The ‘enabling’ technology is ‘disabling’, moreover, precisely because of its institutionalizing/medicalizing qualities. Artefacts with no aesthetic value “tend to be poorly designed, because they’re purchased by institutions.” However, Ju believes that wheelchair design is actually rapidly improving, and that it is economics that has made the difference – the recent proliferation of private companies providing wheelchairs direct to consumers. There are now different weights, different colours, chairs that work better as well as looking better “and I think the stigma attached to them in that sense is changing as well.” One of the reasons, perhaps, that disabled people do get reduced to their aids – “the wheelchair” as opposed to “the wheelchair user” - is simply their appearance. If you have a standard wheelchair you get standardised by it.

Ju: It’s very much that whole sort of post-modern approach that we assign value, there’s no kind of ‘given’ – we assign a different value to having a Dyson to having a wheelchair. We assign a different value to having a bicycle, to having a wheelchair.

Lots and lots of people use cars to go out and get their shopping. But if it’s a Shop mobility mobile wheelchair, the value assigned to the wheeled transport is radically different.

Ju: I’ve got an electric chair that I use far more because I don’t have a car – and yet I’m viewed very different from somebody who can’t walk that far and can’t carry but drives to the shops. And yet in both cases we’re using wheeled transport for a particular reason relating to our impairment.

So the social status of technological artefacts is actually indistinguishable from the social status of the person who uses them: the ‘enabling’ technologies both reflect
and define the social status of their users. Enabling technologies, as thing-actants in networks of people and things, are as performative as the people-actants they relate to. Wheelchairs have 'fronts' – colours, technological sophistication levels, fashion accessories – which impute differing statuses to different people in different situations. If this is true of wheelchairs, how much more so of the myriad other politically saturated artefacts in our society? If the Things with which we mobilise and glue together our society are as much a part of our society as we are, what of the dreams of those who would wish to incorporate more of the world of Things within our bodies themselves/ourselves?

(D) Neuroprosthetic Enhancement?

Against the backdrop of the potential military applications of the sort of neuroprosthetic technology he is developing, what does Professor Norman think about such performance enhancement?

Prof. Norman: I made the premise to start with that I thought the best we could do is to take people who are non-performers and make them very poor performers. That's the best that we can do. A blind person who's profoundly blind - we will be able to reproduce some limited visual experience, but it's going to be extremely primitive compared to what you and I enjoy.

So for Norman, at least for the next few hundred years, the human eye is going to be better than anything modern technology can provide. At least, that is, for everyday contexts. In specifically military contexts, there may in fact be factors at work that make the technological eye crucial.

Prof. Norman: If you're a jet fighter pilot, and you're flying at Mach 1 and having a dog fight with some enemy or something like that, a 10th of a second becomes very important. And it takes about a 10th of second to go from here [brain] down to here [finger] and if you
can recognise this firing pattern directly then it gives you a 10% increase in performance. That could be a significant advantage.

So "performance enhancement could be possible through an implant system" in certain very specific situations. Clearly, though, a better way in this case would be to make airplanes fly even faster and turn sharper. The G-loads would be twice as high as they are now, which would make it necessary to take the pilot out of the plane and let him fly it remotely – back to Norman’s dream of Telepresence.

Prof. Norman: Yeah, exactly. Then in fact, you can move much faster, and dodge much more effectively, without having to worry about blacking out, which is the limitation right now. So there are better ways to do that, than putting chips in people's heads. So I don't think we have to worry too much about chips in people's heads, period. Except for people who are really, completely disabled.

Joel Burdick of the California Institute of Technology, has been undertaking experiments on monkeys, trying to test cortical control signals and motor cortex signals. Using Professor Norman's Utah Array, implanted in monkey's brains, the experiments are trying to isolate signals high up in the cognitive chain where motion plans are first formed, in order to determine the direction of reach. In essence, computers are beginning to aim and fire a gun in a monkey's hand from cortical signals in the monkey's brain, faster than the muscles in the monkey's arm can do it. Burdick acknowledges that of course such invasive surgery would not be popular amongst the infantry, but hopes new scanning techniques will be invented to obviate the need. These experiments are of course not described on his Burdick's website, for fear of opposition from Animal Rights groups [See Appendix on EHPA Conference].

Enhancing neuroprosthetics, then, for the military, are already in research and development, but clearly a long way off yet. In theory, however, such technologies can surely be regarded as extremely performative in their potential impact upon people. If enabling technologies for disabled people, and by implication the social infrastructures
which all of us live within, are, as thing-actants, having so much sway, how much more
so would the kind of cyborgian technologies of human performance enhancement and
augmentation that are becoming increasingly less the stuff of science fiction and more
the subject of academic and military research projects?

(E) Extruded Awareness?

Enhancing technology is of course in Stelarc’s arena, and his piece, “Fractal
Flesh” directly addresses this issue – how a people-actant might be directly and viscerally
manipulated by one of the most high-tech of the thing-actants in our world: the Internet.
In Fractal Flesh, Stelarc hooks himself up to a plethora of electronic stimulators that take
over control of his musculature, and literally jerk his limbs with the use of tiny electric
shocks. These stimulators, in turn, are hooked up to computers monitoring the flows of
traffic upon the internet, and as the website hits and email deliveries of the global system
ebb and flow, so Stelarc’s body moves and writhes in time and tune to its chaotic
rhythms.

Stelarc: Yes the Fractal Flesh possibility speculates about the idea of the cyborg not
simply being a cyborg individual body - a kind of medical military model - that has been
damaged biologically and is reconstructed with technological components; so instead of this
cyborg body idea the cyborg becomes a sort of cyborg-system of a multiplicity of bodies
spatially separated but electronically connected - the internet perhaps as an external nervous
system that connects these operating nodes, and allows for an extended operational system to
come into being, or extruded awareness to come into being.

This ‘extruded’ awareness is perhaps analogous to some noospheric super-
consciousness of heterogeneous networks, and belongs perhaps more rightly to fiction
than theory. Yet Stelarc believes that it is something we could develop if we reapplied
our bodily consciousness to one that included the technologies we use and extend
ourselves with. Does Stelarc feel we are in danger of losing our sense of personal
responsibility, if we give over to such electronic extensions of ourselves too much of our autonomy?

Stelarc: So yes, notions of individual and ethical responsibility seem to be challenged in those kind of models, but the sorts of models that are proposed or seemingly proposed in these performances don't turn the Subject into an automaton nor into a kind of fuzzy spiritual noosphere - you know Teilhard de Chardin - rather, what's intriguing about these operational models, these new cyborg systems is that a body fully aware can experience the remote promptings of other bodies in other places, can become a host for a multiplicity of Subjects - not in a sort of schizo-pathological way but in an aware and collaborative way. We're not necessarily undermining, but rather constructing more complex bodies, in other words from the sort of simplistic model of a body with an own ego and awareness, here we're talking about bodies with egos and awareness but also hosts for other sorts of agencies, remote agencies.

This author would argue, perhaps, that, rather than the quasi-science fiction like dreams of complex bodies of which Stelarc speaks, we are witnessing, in pieces like Fractal Flesh, an allegorical picture of what is already true of our lives in modern societies. The image of the internet hooked up to our musculature and stimulating the jerking chaotic rhythms of the traffic of millions, the concept of remote agencies controlling our movement, is in fact a very pertinent, and, this author would argue, suitably off-putting vision of the world of modernity, in which the hybridised networks of things and people have become so complex and so prevalent that the thing-actants our socio-political structures insist on leaving out of our representative democracies have actually become our true rulers, and we no longer have all that much say in the running of our lives. All this, for Stelarc, seems lost, however, in pursuit of his fascination for multiplicities. "What's interesting here is not the notion of control, nor the notion of subjugation, nor the notion of the automating of human awareness, but rather the construction of more complex and extended operational systems."
The multiplicities he speaks of here are fascinating, but, this author would argue, are founded upon an assumption that under closer scrutiny falls down: that the awareness and intentions, in short the consciousness of an individual, can be encompassed, translated, communicated by and through digitised, data-based information flows. We come up against Hayles' critique of the imagined matter/information duality at the heart of modern information theory. The 'multiplicity of bodies' in the Fractal Flesh model using the Internet as a kind of "external nervous system" may indeed be able to exchange physical stimuli - electric shocks applied to muscles producing movement - but the 'extrusion' of awareness Stelarc talks of that could make the body hooked up to such a system a host for a 'multiplicity of Subjects' is clearly an imagined one. The body in this scenario is no more a host for multiple subjects than if it were being directly manipulated by a team of osteopaths. The electronic stimulation system and the possibility of remotely controlling such a system constitute a means by which other subjects manipulate the body of the subject at the centre. This is not a combining of awareness, or a multiplicity of subjects. This is teamwork in defining the situation amidst a heterogeneous network of people / bodies. The extrusion of awareness on the part of the 'host' is no more - and no less - than that achieved by the shaman whose co-consciousness with the deity or totemic animal he performs guides his movement, or the dancer whose subsumation into the collective physical performance by the troupe directly interprets the music. The 'host' experiencing this 'multiplicity' is not not himself, whilst being not himself, but is also most definitely not several subjects, whilst subject to manipulation by several 'others'.

Yet Stelarc also spoke of some very interesting and pertinent ideas regarding the nature of the body, and of consciousness:

Stelarc: When ...[I say]... 'the body', [I mean] the total, physiological, phenomenological, cerebral, operating entity in the world. The distinction between mind and body or mind and brain is really counter-productive, and really I think philosophers like Merleau-Ponty, who talks about a contextualised body. an immersed body. a body that in a
sense constructs the world through its experience of the world - in other words, space and time are functions, in a sense, of the body, not just simply objective states that you measure. I find those philosophers most interesting.

Indubitably! Space and time as functions of the body is quite Bergsonian, in fact, as Merleau-Ponty himself points out in his work, "Phenomenology of Perception." For Merleau-Ponty the body is "that by which there are objects," that is, it is not an object itself, but the "condition for objects" (Bannan 1967:64). That the body is not "completely constituted" – or as Butler would say, in a continual process of being morphologised – is, for Merleau-Ponty, a "mark of its intimacy with the constituting function, which is consciousness" (Bannan 1967:64). Discussing the phenomenon of phantom limbs, Merleau-Ponty urges us to distinguish between the actual body and what he describes as the "habitual" body – the body of lived experience - a distinction Butler also makes. We shall return to Merleau-Ponty in later chapters, but for now it must suffice to highlight that these distinctions are not between mind and body. Stelarc's rejection of such a false distinction as that between mind and body is refreshing. But how does this square with his concept of the modular body?

Stelarc: The idea that you may have replaceable components or parts of the body are interchangeable doesn't necessarily mean that somehow it's a disembodied mind that is of importance and the rest of it you can kind of muck around with. In other words, we don't still have to perpetuate the notion of some intrinsic essence or mind to justify or explain either the holistic or the modular, and so all we mean there is that other physical bodies can operate and provide life-support systems for bodies that have medical problems. I don't think it's necessarily a relationship of mind and modular body, but rather functioning bodies and malfunctioning bodies, so that's really the distinction, and malfunctioning bodies would be better designed as modular bodies because you could then more easily replace things that are failing. That's the problem with the analogue body, it's a very subtle and complex system, but it's also a system that, where a small part of it fails, the whole system can die. Whereas, say, redesigning a body in a more modular way might allow you the possibility of sustaining that
body and for it to be effectively operating for longer periods of time because failed components can be replaced more easily.

This author remains unconvinced, and, in the end, unanswered. At root, the scientific myopia regarding the nature of consciousness allows opinion and muddled thinking and ill-thought-through assumptions. If it is the body that thinks, and as our anatomists have drawn for us in a very detailed picture, the various systems of the body reach out from central organs to every single cell of it, then the body must, by definition, operate - and think - as a whole. Highly complex and adaptable, it can stand various parts and functions of it shutting down and becoming inoperable, and through its heterogeneous networks of people and things even retain mobility and viability without limbs, but there are limits to its adaptability, organs and systems without which it cannot sustain itself. Thus far, this author is in agreement with Stelarc. But the concept of the 'modular' body can only go so far, in the end, before it becomes artificial intelligence, and somewhere along such a continuum consciousness must be translated into digital form. In this Stelarc is mistaken.

Stelarc's 'extruded awareness', which this author reads as a performed reality in which one is not not oneself whilst being not oneself, would seem to be a consciousness that operates in both the organic body and in digital form - simultaneously!

II) Enhancing Technology?

We shall be discussing in the next chapter the future - military - possibilities of exoskeletons for human performance augmentation, and also in the context of cyborg fiction, that the motorcar is an exoskeleton that enhances human performance. To understand how deeply the motorcar, and indeed all the technologies and artefacts of modern consumer society, are interwoven with our sense of self, and as performative thing-actants have a literal influence upon our lives as people-actants in the networks of our culture, we must here take a brief look at the origins of the consumer society in the 20th century invention of Public Relations.
Public Relations was invented by Sigmund Freud's nephew, Edward Bernays, in the 1920s. Following the Second World War, politicians and planners had come to believe Freud's underlying premise - that dangerous and irrational desires and fears lay deep within all human beings. To them, it was the unleashing of these instincts that spawned Nazi Germany. To prevent it ever happening again they were intent on controlling this 'hidden enemy' within the human mind. "The US government, big business, and the CIA used the ideas of Freud and Bernays to develop techniques to manage and control the minds of the American people. But this was not merely a cynical exercise in manipulation. Those in power believed that the only way to make democracy work and create a stable society was to repress the savage barbarism that lurked just under the surface of normal American life." (Curtis 2002)

During the 1960s, Freud's ideas were challenged by a radical group of psychotherapists inspired by the ideas of Wilhelm Reich, a former pupil of Freud's, hated by the Freud family. "He believed that the inner self did not need to be repressed and controlled. It should be encouraged to express itself." This group directly contributed to - some would say caused - the counter-cultural and political movement of the late 60s that sought to release people from conformity to the 'ideal citizen' as envisaged and promoted by business and politics.

"But the American corporations soon realised that this new self was not a threat but their greatest opportunity. It was in their interest to encourage people to feel they were unique individuals and then sell them ways to express that individuality. To do this they turned to techniques developed by Freudian psychoanalysts to read the inner desires of the new self."(Curtis 2002)

The consumer 'lifestyle' society was born, and 70s sub-cultural groups quickly formed and rushed to own the full set of clothing, music, accessories, and other associated objects, the right kind of job, car, accommodation, to complete their self-identification as a 'member' of one of a range of different cliques. So what if they
thought they were members of a group whose ideas were antithetical to corporate society. They were good citizens of the consumer society. Their precious consumer goods, objects laden with social significance, granted them access to a sense of belonging, to a set of social ideals held in common. By the 1980s some of these groups were greedily gorging themselves upon the glamour of it all, openly in favour of the corporate/consumer society and upwardly mobile in their desire to 'express their inner selves' through the goods they could buy.

By the early 1990s politicians on the left, in both Britain and America, were turning to the techniques developed by business to read and fulfil the inner desires of the self.

"Both New Labour, under Tony Blair, and the Democrats, led by Bill Clinton, used the focus group, which had been invented by psychoanalysts, in order to regain power. They set out to mould their policies to people's inner desires and feelings, just as capitalism had learnt to do with products. Out of this grew a new culture of public relations and marketing in politics, business and journalism. One of its stars in Britain was Matthew Freud who followed in the footsteps of his relation, Edward Bernays, the inventor of public relations in the 1920s." (Curtis 2002)

The politicians, perhaps, really believed that focus-group democracy was better than what had gone before. Philip Gould, the New Zealander, and Peter Mandelson, it seems, had the faith. They believed that this new way of doing things truly responded to the inner feelings of the individual. Alas the aim of those who had originally created these techniques had not been to liberate the people but to develop new ways of controlling them.

What the world of Public Relations has created, in fact, is a world of spin and pretence, a world, in Ballard's words, "ruled by fictions of every kind" in which "politics [is] conducted as a branch of advertising." (Ballard 1995) A world in which business and politics alike use the techniques developed in the inter-war years to control mass
populations, and keep them docile and content. A world in which we actually have to go out and buy our own 'soma.' (Huxley 1994) A world in which consumer goods define for us who we are. A world in which the most prized and precious of those goods is the car.

It is the contention of this thesis that these goods are performative, that as thing-actants in the network of social relations it is the goods themselves which define the social grouping, and name it into being, and the people-actants of which the social group consists are taking their cue from the consumer goods, and not the other way around.
c. Conclusion

In this second chapter then, we have examined through the lens of performance the nature of human identity. Through an analysis of the presentation of self we have elucidated that the Self is constituted and shaped by the performance of roles, and that the process of interaction defines the performance that defines the self. Examining the performance of roles itself, we have seen how performativity, as citationality, elucidates for us a picture of the Self as morphologised, sexed and gendered by the interweaving of the many sets of norms and cultural codes of a particular time, into which it grows and which its existence is a citing of, a reiteration of. Moreover, in our examination of the presentation of status, breaking down these norms and cultural codes into ‘serious speech acts’, we have seen that it is their place in the network of other serious speech acts, and nothing more, which gives speech acts their seriousness, and thus makes them statements – norms and codes whose citation carries weight, and imputes to the Self the status that will help sway a working consensus in one individual’s favour.

We have then looked to the nature of ‘things’ in our society, and through a brief introduction to the politics of artefacts and actor network theory elucidated that objects indeed carry far more weight in our everyday lives than the modern constitution would have us believe, that society is made up not of human interaction, but of human interaction with each other and with countless things. Moreover, we have seen that the performance studies model already applied to human beings must now be applied also to these very things, if a true picture of modern society is to emerge.

Performance, then, as a central trope for the understanding of the modern world, and of ourselves, has led us to an appreciation of how things – carefully demarcated by modernist political philosophy from people – as thing-actants, have come to play at the very least an equal role in the creation of our identities and the day-to-day decisions of our lives. Through the lens of disability studies, we have seen that the objects and artefacts we surround ourselves with do indeed carry performative power in the
formation of our identities, and thereby our societies. We have glimpsed how this may feed into an understanding of the central figure of this thesis – the Cyborg.

In the next chapter, we must begin to focus upon this figure, and to see what clues it may have as to the nature of the relationship between things and people, and how the increasing power of things in our lives is truly regarded. To do so, continuing our theme of performance, we shall also examine how, when the individual performances and performative actions of all the actants in society – both human and non-human - are put together, great overarching social, or cultural performances come to light, that can in turn be read.

In the next chapter, then, we shall cast a critical eye upon this notion of Cultural Performance through a holistic perspective on history, society, literature, and culture, that will enable us to see not only the long pedigree of the cyborg as a cultural figure, but what it means in relation to the march of scientific progress. We will also see how Performance pervades every corner of the seamless fabric of the western world.
3. Cultural Performance

Taking a broad cultural perspective on history, society, the arts, and religion, it is possible to see a long pedigree for the cyborg as cultural trope, and in this chapter the author intends to explore what it means in relation to the march of scientific progress. This examination falls into three separate but interlinked areas: a.) an introduction to the theoretical tools by which 'stories' and 'narratives' are seen to thread their way through everyday life over historical periods of time, and by which certain social phenomena can be linked to a difference in response, from different parts of society, to innovations and changes in social evolution; b.) a grand tour and review of some of the most famous and pertinent examples of the Cyborg figure in history, how each can be interpreted using the theoretical tools just introduced, and a close examination of the vitalist philosophy that runs through all of them; and c.) a deeper cultural critique showing how the notion of cultural performance reveals the profound “as if” at the heart of the Modernist project.

The chapter is broken into three sections. First of all there is an introductory section on narratives and stories, outlining the basic tenets of narrativity. This is followed by a long section on cyborg narratives, introduced by a discussion of the notion of cultural lag. The cyborg narratives themselves are divided up into three parts – cyborgs in fiction, outlining the main cyborg stories from literature; cyborgs in fact, detailing modern scientific instances of the cyborg as planetary ecosystem, space-man, and military apparatus. This is followed by a review of cyborg theory in general. The third section focuses on a cultural critique of the 'metanarrative' of western society, and on a description and retelling of the counter-narrative of Vitalism.
a. Narratives and Stories

i. Stories we perform

The contemporary cultural figure of the Cyborg comes from quite a long lineage, and in this chapter we shall be referring to what this author considers to be the most significant of these fictional antecedents, as well as taking a sneak preview at the forthcoming – and all too real - paragons of the genre. We shall examine these stories in the light of the notion of Cultural Lag, and seek to show how the figure of the cyborg in history can often be interpreted as a trope through which the anxiety thrown up by cultural lag frequently expresses itself.

The mythological and fictional accounts we shall be referring to are not just simple stories, either. Stories guide action. As Somers asserts, "people construct identities (however multiple and changing) by locating themselves or being located within the repertoire," (Somers 1994:613) of such stories. "People are guided to act in certain ways, and not others, on the basis of the projections, expectations, and memories derived from a multiplicity but ultimately limited repertoire of available social, public and cultural narratives." (Somers 1994:613-4)

That is to say, that the roles we perform in life are, by and large, characters in one of a multiplicity of stories, and that these stories cover not just the social spheres in which we meet, work and play, but the public spheres in which institutions are created, jostle for influence, and decline. That is to say, that the roles that we perform in life are often laid out for us by greater cultural narratives whose lifespan extends far beyond both our grandparents and grandchildren, let alone our own brief sojourn through life. That is to say, that the Individual Subject of the Enlightenment Project, the Humanist Subject whose lineage goes right back to the "credible, worthy, well-to-do witness" of Boyle's experiments, is a character in a cultural narrative, a role to be played, and the
Objective world represented to that Subject, a scenario laid out before him upon the stage where he performs.

Truth, as Rorty tells us, is made, not found, and though today some philosophers are still wedded to science, and regard "making truth as a merely metaphorical, and thoroughly misleading phrase... Other philosophers, realising that the world as it is described by the physical sciences teaches no moral lesson, offers no spiritual comfort, have concluded that science is no more than the handmaiden of technology. These philosophers have ranged themselves alongside the political utopian and the innovative artist." (Rorty 1989:3-4) As we have seen in the first chapter, there is little justification to "...the claim that the world splits itself up, on its own initiative, into sentence-shaped chunks called 'facts.'" (Rorty 1989:4)

The stories and narratives that Somers refers to, the truth-making activity to which Rorty is referring, are often dismissed by scientific philosophers as 'merely' myths. But other philosophers have turned to the nature of myth and found very interesting results. Most famously, it was Levi-Strauss, in his discussion of the phenomenon and authorship of myths, who asserted, "Myths are connected with one another across considerable distance of time and space in that they represent the elaboration, the working out of different, perhaps complementary possibilities within the general pattern. Thus meaning originates from the "system", not from the individual." (Cuff, Sharrock et al. 1998:217-8)

ii. Stories societies perform

Levi-Strauss, of course, epitomised the structuralist approach with his profoundly anti-humanist perspective, which promoted the 'subject decentring' movement that followed him. This decentring of the humanist subject in favour of the systemic, social construction of the individual, led on to an attack against the whole modernist project – an attack undertaken by the post-structuralist movement with which this thesis would
perhaps align itself. The charge is, effectively, that modernism is founded on what Lyotard terms 'meta-narratives' - great over-arching socio-political stories like, for example, the humanist project of enlightenment. The concept of metanarratives recalls Somers' point about cultural narratives – the idea that whole societies live out or perform fundamental stories that cover hundreds of years.

Of course, from the post-structuralist perspective, when the Subject itself is thus in question, what then of the Object? What of representation? Objective science, as 'truthful' representation of Objective reality to the Subject, becomes historically contingent, laced with its own rules of legitimation, its own socio-cultural reality. It deals in the facts it defines as facts, and disregards whatever it regards as fiction. Lyotard's attack upon the modern reaches to its core. (Lyotard 1997) On an epistemological level, Latour's reading of Boyle's fabrication of facts within the theatre of the laboratory becomes a historically contingent truth-creation exercise. In this grand cultural narrative, a Humanist Subject is created to which to represent an Objective reality that is no less a creation. The denizens of this Objective reality, moreover, are as much performed roles as is the Subject, for all that it is 'merely' puppets – the mute objects around which 'facts' are fabricated – that are made to play such roles, animated, off-stage, by the voices of other Subjects who pretend that their fabricated 'facts' speak for themselves. The humanist project of enlightenment, seen in this light, is a grand operatic comedy of errors, in which the actors are all sovereign kings and princes running around doing the bidding of the puppets whose off-stage voices they themselves provide.

The concept of the meta-narrative, interestingly, one can find in much finer detail in the Foucauldian concept of the episteme. Neither a form of knowledge, nor a type of rationality, the 'episteme' is nothing less than the total set of relations that unite the discursive practices of a given period. It is similar to a concept introduced by Kuhn: the paradigm. (Kuhn 1970) Both concepts attempt to account for the apparent unity of a scientific community through allegiance to something other than a shared set of beliefs. The episteme, moreover, "is what, in the positivity of discursive practices, makes possible
the existence of epistemological figures and sciences.” In short, the many disciplines and sciences of a given period belong to that episteme, are made possible by that episteme. Not unlike the relationship between Foucault’s discursive formation and the statement – in which a statement gains its verity from being a part of that discursive formation, and only from that – the thresholds through which a discursive formation may emerge, from inception to established ‘given’, are themselves governed by the episteme, which in turn becomes more than the sum of all the discursive practices at a given period. Fluid in nature, it is “a constantly moving set of articulations, shifts and coincidences that are established, only to give rise to others.” (Foucault 1995:192)

b. Cyborg Narratives

i. Cultural Lag

In the context, then, of these great over-arching cultural or meta-narratives, these stories that hold together huge epistememes of discourse, and gather unto themselves the entire social, intellectual, institutional and cultural life of a given period, we must remember Latour’s argument about the ‘phalanx’ of time, about how any particular time includes elements from many different periods, ontologies, and genres, and that the Modernist myth of the phalanx is a smokescreen. Any historical period, in fact, when looked at with a clear eye, will reveal “a great hotchpotch” of different times. As the plot of the over-arching cultural narrative of an episteme moves on, then, different parts of the social fabric will respond in different ways, and at different rates; some parts may not respond at all!

In his seminal book on social change written in the early part of the twentieth century, William F. Ogburn assessed how American culture had adapted to the changes in material conditions wrought by the Industrial Revolution in the latter half of the nineteenth century. He argued that the rapid change in material conditions had resulted in numerous examples of what he termed “cultural lag.” Ogburn coined the phrase
"cultural lag" to describe what happens when related parts of a culture react to change in different ways, to strikingly different degrees, or at different speeds. When such an imbalance occurs, Ogburn argued, social problems are created. Now, Ogburn noted that although changes occurred in the adaptive culture when new technologies were introduced, the changes "do not synchronize exactly with the change in the material culture." Instead, he observed, "There is a lag which may last for varying lengths of time, sometimes indeed, for many years." During this period of maladjustment, Ogburn also noted that "the old adaptive culture ... hung over after the material conditions had changed," and that even though "it was being modified some as time went on" the modification was never sufficient "to meet the new conditions even approximately." (Kelly)

An often-cited example of cultural lag is the automobile. The public was quick to adopt and find a variety of uses for this innovation, and those uses spurred the continuing development of the technology. However, other parts of society were not so quick to change and adapt to the impact of the car. It took time for roads and infrastructures to be built; in many cases, adequate infrastructure to support the uses desired by drivers still hasn't caught up to the demand created by the car. (The problems of congestion aside.) The idea of cultural lag, then, is fairly simple: that changes and innovations can and do influence different parts of society in different ways, and that these influences can occur at different rates. When the differential rates, and impacts, become extreme, those differences can create a slew of problems within the society. Thus, cultural lag is more of an explanation for why problems occur than a theory of what causes those differentials, and thus those problems. Still, cultural lag is clearly a real phenomenon.

The speed of technological advance, from Neolithic to Information Age in a little over two and half thousand years, is breathtaking. Yet such wonderful Neolithic inventions as the wheel, bread, and writing continue to serve us extremely well. During this rush forward into a technologically advanced culture, and with a frequency mirroring
the acceleration of technological change, images of the Cyborg have arisen in cultural forms that epitomise – and this author would argue give voice to – the social anxiety of parts of society that are not in the vanguard of change; cyborg figures, in short, that are symptoms of cultural lag.

ii. Cyborgs in Fiction

What follows is a closer examination of several of these images. There is, throughout all these stories, a healthy scepticism for the claims of the scientific community, and a profound sense of the numinous, of the spiritual, that the Modern era has tried so hard to quash. It is fitting, then, that this introduction to the cultural figure of the Cyborg begins with a tale from the Mystical Kabalah of the Jews.

(A) The Golem of Prague

The story with which we begin, from the Judaic tradition, is that of the Kabalistic Golem. The Sephir Yetzirah, a book at the centre of the mystical tradition of the Kabala, is deemed to be the origin of the secret formula by which God first made man out of clay, and makes several mentions of the 'Golem' - a creature made from clay by Jewish mystics. The Merkabah tradition in Kabalism dating back to the first two-three centuries CE made much of this book. But the best known story by far is that set in Prague in the 16th century, which is probably at the least representative, if not definitive. The story goes as follows:

The Jewish community is threatened by blood-libels - claims that they were murdering Christian children and using their blood to make matzo - a kind of crisp bread that uses no yeast. A Christian who murdered a child and planted it in a Jew's house could report the Jew. The Jew would be executed and his property would be split between the Christian who reported him and the government. (In fact, Jewish law strictly forbids the consumption of any blood at all.) Clearly, the ghetto needed a very good night watchman. Rabbi Judah Loew used information from the Kabala to learn the
secret formula. The Rabbi and some of his advisors went to the river and spent seven
days and nights in preparation. Then they modelled a human-shaped from clay. On the
seventh day, they circled the form seven times chanting, and it began to grow hair and
nails. Then the Rabbi circled it seven more times alone, chanting a verse from Genesis
about how God made Man a living soul. The Rabbi took a parchment and wrote four
letters on it, "emet," which means truth (in other versions it is 'God's secret name') and
he put the parchment under the Golem's tongue. When the parchment was there, the
Golem was animate and did what it was told, and when the parchment was removed it
reverted to a lifeless clay doll. (In another version of the story it is placed on the
forehead of the Golem.) The Golem stood up and they dressed it and named it Yosef.

Loew's Golem was between seven-and-a-half and nine feet tall and had
tremendous strength, but had a very placid and passive disposition when not under
orders to act otherwise. He also lacked the one faculty that only God can give, the
power of speech. Because this giant was passive and mute, people in the ghetto
assumed he was half-witted and the word "golem" came to mean "idiot." At night the
Golem guarded the ghetto, catching all would-be libellers red-handed. He single-handedly
ended the possibility of successfully blood-libelling the Jewish community. Loew then got
the Emperor to end the practice of letting blood-libellers profit from their actions. When
the Golem was no longer needed, Loew removed the parchment, returning the Golem to
being a statue, and the statue was laid to rest in the attic of the synagogue.

A popular variation on the story has the Golem revel in his work and become an
uncontrolled monster before being stopped and returned to clay. One story about the
early days of this Golem was probably the inspiration for The Sorcerer's Apprentice. The
Golem was told to fetch water, but not told how much. The result was a minor flood. This
tendency to do what he was told to do, not what he was expected to do, has endeared
the Golem story to computer scientists like Norbert Wiener, the famous cyberneticist. It
may also be part of the basis of Asimov's robot stories.
One variation has it that on Friday afternoons the Rabbi had to be sure to remove the parchment, because if the Golem were awake during the Sabbath, its life force would become irrevocable, because the Sabbath is the vital force behind all things. Of course one Friday afternoon the Rabbi forgot about the Golem. Now some versions of the story say that the Rabbi discovered his mistake in time, and that later, when a strong new king became the people's protector, the Rabbi took the Golem back to the river and destroyed it. Other versions say that the Golem did indeed gain its life force and wrought all kinds of havoc before the Rabbi caught it, and that the Rabbi had to grab the parchment and erase a letter from the word, transforming it from "emet," the word for truth, to "met," the word for death, in order to end the Golem's life.

In terms of cultural lag, this early cyborg figure might be said to have been conjured as the protector of a section of society which had deliberately chosen not to march forward with the latest innovation in their religious practices – the Christian revolution that occurred in Judaism at the turn of the first millennium CE. To view the continued vitality of the Jewish faith in these terms is also, in fact, to question the implicit belief in the march of progress inherent in the word, 'lag'. The concept of 'cultural lag', perhaps, might – certainly in this case – be better phrased as simply 'cultural dissonance'. But perhaps there is also here a deeper mistrust of where the Christian revolution is taking society. The blood-libelling is not simply religious persecution, nor an attempt at ethnic cleansing. It is straightforward, albeit state-sanctioned, theft. Such built-in social imbalances in the legal structures and apparatus of the Christian state were clearly extremely hard to fight. The sense of overwhelming oppression experienced by a persecuted non-Christian minority in Christian society must also have been accompanied by a sense of impotence in the face of that oppression. It is this sense of impotence, this sense that the innovation is unstoppable, that it is victorious in the march of history and that having rejected it, one has consigned oneself and one's peers and family to a minority position within society – and a persecuted one at that – that perhaps acts as the underlying spur for such cultural responses as the myth of the Golem. What is pertinent
here, is that that response, that myth: the Golem, was a cyborg figure – a man-made man, and that it is the divine powers of Hebrew script and the chanting of the Rabbi that breathes life into that cyborg.

**(B) Shelley's Frankenstein**

It has been speculated that Mary Shelley, in the early 19th century, patterned her 'mad scientist' Victor Frankenstein, and his Creature - surely the best-known antecedent of the modern cyborg - on the story of Rabbi Loew and the Golem. Victor Frankenstein's self-education in the works of Agrippa, Paracelsus and Magnus, gave him a base in mediaeval approaches to science, not unlike the Rabbinical Kabalist, and betray his primary reason for an interest in science at all - as he says: "I had a contempt for the uses of modern natural philosophy. It was very different, when the masters of the science sought immortality and power; such views, although futile, were grand: but now the scene was changed. The ambition of the inquirer seemed to limit itself to the annihilation of those visions on which my interest in science was chiefly founded. I was required to exchange chimeras of boundless grandeur for realities of little worth."

(Shelley 1994:29-30)

For Shelley's Victor Frankenstein, assembling a man from the products of the dissection room, a 'vital spark' is needed to complete the operation; an *anima sensitiva* must be 'super-added' to the otherwise dead flesh of his Creature before it can live. Shelley's Creature is a Golem, and, borrowing from the more Western European Druidic tradition (Frazer James 1996), it is lightning that will carry the spark of life into the Creature, rather than Judaic mystical chants.

From the perspective of the notion of cultural lag, Shelley was writing at a time regarded by many critical theorists as the very crucible of the Modern world, the time when the new constitution of Boyle and Hobbes had gained sufficient ground as to be regarded almost as axiomatic. The eighteenth century had seen the march of empirical,
mechanistic interpretations of the world, and the rapid growth of capitalist endeavour, toward what was fast emerging as a new consensus. Most crucially, however, the implications of the new science for Man’s place in the world were finally being realised. As Foucault describes in detail in his work, "The Order of Things," the early nineteenth century, when Shelley wrote her classic text, saw the birth of the Age of Man, the moment when the last thread of the mediaeval chain of being finally broke. Here, at this moment of cultural innovation, it is the Christian world that is left behind by a new secularism for which there is no recourse to the divine whatsoever. Here, too, in Shelley’s text, is another Golem, another cyborg figure, brought to life by a divine spark which the book seems at pains to point out must, surely lie at the heart of what it is to be alive.

The character of Victor Frankenstein in Shelley’s novel is made to play out two distinct but interlocking themes: the mystically educated Rabbinical figure who conjures up life through the application of his arcane knowledge of the divine spark; and the secular modern scientist who rejects the world of the numinous and the spiritual. Victor creates The Creature in his laboratory using lightning from the heavens to induce life into the assemblage of dead men’s limbs, but then rejects his ‘son’ whose truly Christian virtues he only later discovers in the wild wastes of the frozen north. He is at one and the same time the old alchemical sage party to the secrets of the universe, and the new scientific materialist who has no truck with such flummery and nonsense.

Victor Frankenstein’s contest with the Creature in the polar wastes can be said to represent "the attempt of an over-civilised elite to reject it’s real past and its membership of a wider animal community" (Shelley 1994:xlv) Thus we would see Frankenstein displaying a typically Modernist attempt to break with the past, and the Creature, perhaps, representing a more plaintive attempt to retain that element of the ‘special’ that the older, Catholic universe had bestowed upon humanity, but which seemed, now, finally lost to the demonstrations of anatomy playing to packed houses in the laboratory-theatres of early nineteenth century England which the Creature itself is testimony to. If
we consider the Creature as representative not only of our past and animal nature, but of woman, of (black) savage, of the ignoble poor, and of the Christian values the Creature absorbs from the poor, it is possible to suggest that, "Between the advanced and primitive stages of mankind's evolutionary progress there is an inequality not dissimilar from the relationship between the sexes, the classes, the races." (Shelley 1994:xlv) This is cultural lag in stark political terms: the carriers of the torch of innovation persecuting those unwilling to join them.

These prejudices, taken as a group, are often seen as symptoms of a wider ethical and cultural crisis; in women's writing, in particular, they all come under the umbrella of Patriarchy. The irony of these interpretations, however, is that the Creature is the product of advanced, civilised, Patriarchal society - Man invents himself in the Enlightenment and it is but a logical extension of this philosophical self-invention to progress to physical self-invention.

(C) Lang's *Metropolis*

Which is precisely the issue at the heart of Fritz Lang's classic 1926 silent movie, "Metropolis" (Lang 1926): the creation of a robot workforce more compliant and efficient than mere human workers. Lightning, too, in its more twentieth century form of electricity, is what is used by Rotwang in his transformation of his robot, Futura, into the likeness of the workers' heroine, Maria Klein.

Cultural representations of the cyborg throughout history have made use of the Vitalistic principle that some unspecified life force is needed to imbue the man-made creature with life. Otherwise quite contingent stories, drawing upon the context of their times, repeatedly return to this primary thread. In what is perhaps one of the most telling developments of the Golem story, however, the robot creations - the 'machine men' Rotwang offers to create - in Lang's movie, are clearly infallible, and completely
under the control of their inventor. Moreover, fallibility is an unambiguously human trait, in this retelling of the old story.

In Lang’s version the powers of Modern Science have become the enemies of Life. The whole attitude of 19th century mechanistic scientists to what was once held as sacred has spawned a new twist to the narrative of the Golem. The magic that brings life to the clay man is no longer good. Nor is it merely the hubris of a Dr. Frankenstein who does not really understand what he is playing with. Rotwang lives in a spooky little medieval house in the centre of the high-rise city, and is an unabashed evil scientist and necromancer - the Kabalistic Rabbi turned enemy of his people. His robot creation stands beneath a huge upside-down pentacle. It is quite clear that for all the machinery and appearance of science, there is magic involved here with the essence of life - the ‘vital spark’ of the Vitalists - and that this magic, in this context, is evil. The resurgence of interest in vitalism in the 1920s is mirrored here, with dark foreshadowing of the Nazism to come.

The workers-versus-management theme in the film is centred on the failure of the human body to live up to, or match up to the expectations of an increasingly mechanised world, and the prospect of replacing the human body with something new. From the perspective of the notion of cultural lag this is to place an entire class – the proletariat – in the position of the minority left behind by innovation. The story faces us with a very contemporary and thorny question: what is it that makes the distinction between the living and the non-living - and if there is no distinction what is to stop us from replacing fallible, imperfect human beings with reliable, efficient robots? It is a question that might be asked by Norbert Wiener, (1894-1964) whose cybernetic theories were beginning to emerge at the time of the film’s making, albeit that it would be a further twenty years before the publication of “Cybernetics : or control and communication in the animal and the machine” (Wiener 1946), and four years after that before “The human use of human beings : cybernetics and society” (Wiener 1950) made it to the bookstands.
"I have created a machine in the image of man, that never tires or makes a mistake." Rotwang chortles, "Now we have no further use of living workers." He holds his black-gloved right hand up to Fredersen, declaiming: "Isn't it worth the loss of a hand to have created the workers of the future - the machine men?" (The art/science of prosthetics is portrayed here, in stark terms, as a natural precursor to that of robotics.)

Lang's 'machine men' are perhaps not deemed to be 'alive' in the sense that the 'living workers' are - the film nods somehow here to an unspoken belief in some 'anima sensitiva' - but the transformation of the robot into the likeness of Maria has become an absolute classic of cinema: every Frankenstein movie since has used this mad-scientist set with electrical arcs and bubbling liquids to portray the evil magic of Man playing God.

In 'The Golden Bough', we learn from J.G. Frazer's research that the Druids of Western Europe believed that lightning carried the seed of life from the sky to earth. The parasitic bush mistletoe was thought to be directly seeded by lightning strikes, and its branches were cut to be used as wands. After some months the green twigs would turn a rusty golden colour. (Frazer 1996) Lightning, too, was the favoured weapon of such Gods as Thor and Zeus, and even Jehovah has been known to throw the odd bolt at the wicked. In the twentieth century this ancient story has attached itself to electricity - though in some of the Frankenstein movies it is still a bolt of lightning that powers the electrical engendering of life that transforms the Creature from a fleshy jigsaw-puzzle into a living being.

Maria Klein and her robot facsimile are in some ways not unlike Shelley's Creature. Lang's heroine, the worker's daughter, preaches to a mass meeting of the workers the romantic belief that the 'brain' and the 'hands' of the city - the elite and their workers - should be mediated by the heart. Thus the city is understood through the image of the body, and through a version of the image of the body that is distinctly Christian in flavour - the 'heart' is to be a Messianic figure that will come and save them all. Again, in terms of the notion of cultural lag, we have the appeal from an oppressed minority to an older, more spiritual sense of the whole, the appeal to a past and to a
divinely mediated connection with the wider world that the newly urbanised proletariat clearly lack.

The failure of the body, moreover, is the failure of the city, and prompts not only an evil plot to do away with the human bodies of the workers altogether - through the intervention of an evil robot-golem, a 'black' heart sent to destroy the workers - but also a heroic hope that it can be reversed through an appeal to divine intervention. This appeal sounds clearly the note of pre-Darwinian philosophy, the belief in a supreme creator, in an otherworld beyond and superior to that of mechanistic science and the evil it is seen to bring to the human world.

**(D) Huxley's Brave New World**

This distrust of Science as the keeper of humanity is shown starkly in Huxley's famous novel of 1932 (Huxley 1994) - barely six years after Lang's film - yet brings us, paradoxically, into the 21st century. Lightning and electricity have been left behind, and we are back to the letters on the parchment. But the sacred words with which the new golems will be made are not written in Hebrew, but in the new language of micro-biologists - genetic code.

The medicalisation of the human body through the sciences of anatomy and pharmacology in particular is portrayed in a nightmare vision in this famous cautionary novel, "Brave New World." It is Huxley's stated dream, as he puts it in his introduction, that "Science and technology [should] be used as though, like the Sabbath, they had been made for man, not (as at present and still more so in the Brave New World) as though man were to be adapted and enslaved to them." (Huxley 1994:3) Here we see once more the antipathy between pre-Darwinian Vitalist teleologies and the Modern, mechanistic model of man, brought to us in strong narrative form.

In this same introduction Huxley lists the main criteria he posits would be required for a totalitarian future, the last of which reads: "And fourth (but this would be..."
a long-term project, which would take generations of totalitarian control to bring to a successful conclusion), a foolproof system of eugenics, designed to standardise the human product and so to facilitate the task of the managers. In Brave New World this standardisation of the human product has been pushed to fantastic, though not perhaps impossible, extremes." (Huxley 1994:9) Huxley devised, for his novel, an elaborate process of forced 'twinning' dubbed the 'Bokanovsky' process, through which 'the human product' could be reliably standardised. Today's technology could make the entire process so much easier, as cloning - the Modern, existing science of making twins - could replicate specific examples of what were regarded, 'Perfect Bodies.' (Extraordinary to note that, in pre-Colonial Nigeria, twins were discarded into the 'evil forest,' deemed by the witch doctors to be 'unnatural'.(Achebe 2001))

The whole concept of standards and of perfection when considering human bodies, however, is of course quite contradictory to what the sciences of anatomy and ecology have themselves made all too clear to us - that no two of us is alike - not even twins - that on the contrary each of us is fundamentally unique, and that any notion of 'perfection' is necessarily, therefore, redundant, and, furthermore, that standardisation is fundamentally contrary to the diversity that is requisite for species health - and survival.

All concept of a vitalistic spark has been expunged from Huxley's World State. People meet in Solidarity groups, make the sign of the T, and take drugs. "The service had begun. The dedicated "soma" tablets were placed in the centre of the dinner table. The loving cup of strawberry ice-cream "soma" was passed from hand to hand and, with the formula 'I drink to my annihilation,' twelve times quaffed. Then to the accompaniment of the synthetic orchestra the First Solidarity Hymn was sung." (Huxley 1994:72) The whole Fordist religious ceremony is a typical absorption of Christian and Pagan ritual traditions, (perhaps more Pagan than Christian, what with all the circle dancing) in the service of Fordist unity - 'oh make us one, like drops within the Social River;' - akin perhaps to Nazi Christianity, but with the music cleverly tuned to biorhythms to stimulate the requisite emotions, and drugs to release any inhibitions. Also
akin to some kind of Shaker or Evangelical/Pentecostal rapture. There's even a sense, perhaps, that the Apollonian/Dionysian duality of human nature is recognised by the efficient Fordists and catered for, with the Dionysian firmly in its allotted place.

In terms of the notion of cultural lag, Huxley's Bokanovsky-fied cyborg people, the populace of the Fordist World State, alphas, betas, gammas and deltas all – a complete race of cyborgs, no less – present us with a nightmare vision of where science, as handmaiden of technology with no moral brake, might take us. The oppressed minority who in this case might get left behind by the rush of innovation is none other than humanity itself!

The impressive fame of the book both at the time and, enduringly, since, is based not only on Huxley's imaginative and literary work, but on how closely the book resonates with the broader anxieties of the average reader in the Modern Western world. It is a story with which many of us can identify and sits alongside the more nakedly political dystopia, Orwell's "1984", which followed some years later, in the popular imagination: the two works, together, are often cited as prophetic nightmare visions of a future we get closer to every day.

Fascinatingly, it is the 'disabled' nature of Huxley's main protagonist, Bernard Marx, that helps him discover his own identity:

"For whatever the cause (and the current gossip about the alcohol in his blood-surrogate may very likely - for accidents will happen - have been true)....He stood eight centimetres short of the standard Alpha height and was slender in proportion. Contact with members of the lower castes always reminded him painfully of this physical inadequacy."(Huxley 1994:57-58)

This difference, moreover, is what gives him kinship with John, the 'Savage', born of the 'she-dog' whose promiscuity – normal in the Fordist World State – is frowned upon by the other inhabitants of the Reservation. "...it makes me feel as though..." he
hesitated, searching for words with which to express himself, 'as though I were more "me", if you see what I mean. More on my own, not so completely a part of something else. Not just a cell in the social body.'" (Huxley 1994:81)

A more recent, cinematic take on this issue was presented in the Hollywood movie, "Gattaca", (Niccol 1999). In this film, Vincent, the main protagonist, is an outsider, a natural birth or 'in-valid' living in a world in which designer people, forged in test tubes, rule society. (A very Brave New World, indeed.) Determined to break out of his imperfect genetic destiny, Vincent meets Jerome - a 'valid', willing to sell his prime genetic material for cash. Using Jerome's blood, urine, skin and hair samples Vincent is able to forge a new identity. Vincent, the in-valid, has a heart condition, which would normally prevent him from realizing his dream of space travel – unless he becomes someone else, an athlete with a perfect heart, like Jerome. Jerome, paralysed from the waist down by a terrible accident, appears in his life, and "sells" his DNA identity to the hero of the movie, in exchange for a good income.

This cultural narrative of the disabled figure in an otherwise designer-healthy populace appeals to our – quite natural – anxieties of not 'making the grade' in a future world of perfect bodies. The implications of the sciences of anatomy and biology, and more recently micro-biology and genetics, despite their assertion that we are all unique, threaten our very sense of belonging to the human race, and many of the cyborg stories of the twentieth century – Metropolis, Brave New World, and Gattaca to name but three – are clear expressions of this anxiety.

The Disability Rights Commission, in the UK, has in fact very recently published what it calls a "background paper" on "Genetics and Disability" (DRC 2001) in which it addresses this very anxiety:

At the heart of disabled people's fears about developments in genetics lies a concern that it facilitates the operation of eugenics. Bill Albert of the British Council of Disabled People has described pre-natal genetic diagnosis technology as "the perfect eugenic tool."
Eugenics is the age-old attempt to control the gene pool of a society by methods such as planned sterilisation (as recently as the 1970s, US psychiatric institutions sterilised some patients), controlled reproduction, and in some cases infant exposure or murder (the Nazi regime). Although there is no question in Britain of a state-sponsored eugenics programme, the concern among many disabled people is about a new form of eugenics — 'consumer eugenics' — and the indirect social and economic pressures that determine individual's choices. It is argued that developments in genetic testing, and the cumulative choice of millions of individuals, influenced by fears and prejudices about disability, will lead to a huge reduction in the numbers of children born with what society has deemed unacceptable physical or mental impairments. This is viewed as an intolerance for the variety of human characteristics and a devaluing of the lives of disabled people. Many disabled people also fear that widespread use of genetic testing might encourage intolerance against disabled people by identifying them as 'abnormal' and by leading to impairments being seen as 'self-inflicted' (in the sense that parents have chosen not to abort or that people have refused testing or treatment). In addition, there is concern that disabled people may be viewed as 'tainted' by heredity. (DRC 2001:7)

The contention that the genetic revolution will be consumer-, or 'parent'-led is certainly familiar. The lack of any overarching moral impediment to genetic research and its application in self-evidently deserving individual cases seems unstoppable, as well as alarming from a wider perspective. The genetically engineered designer baby, as pictured here, is simply the one that was allowed to be born. Diversity and the true value of the lives of disabled people is sacrificed in favour of procreating something closer to the ideal, 'perfect child.' If the picture of a future without disabled people is alarming, what of the inevitable follow-up to such a world, a Gattaca-like place, where those whose genetic make-up has not been predetermined by scientists, are considered disabled, 'in-valid.'

There is a clear delay between rapidly advancing clinical implementation and the formulation of appropriate legislation or regulation, to the extent that even when such
legislation finally makes it to the statute books it is already out of date. The Committee of Enquiry into Human Fertilisation and Embryology which resulted in the Warnock Report in 1984, led to the Surrogacy Amendments Act 1985 and the Human Embryology and Fertilisation Act 1990. Both were arguably already being outstripped by advances in technology before they hit the statute book.

There is a widespread sense that scientific capabilities have outstripped society’s ability to control the purposes to which they are put – and to understand the long-term consequences of choices. Baroness Warnock summarised these fears: “New possibilities seem to be opening up which make us able to be controlled, or remodelled at will (or worse, someone else’s will).”11 There is also widespread public concern that scientists do not understand the practical consequences of ‘meddling’ with genes – witness the widespread protests against genetically modified food.(DRC 2001:10)

The parent-led genetic revolution is something which rests upon a socio-philosophical foundation inherited from the Individual Subject of the Enlightenment project – namely the autonomy of the individual, enshrined in our ethics and in our laws. But as the DRC points out:

There is a danger that autonomy is taken to be the only guiding principle, ignoring other human rights concerns, such as non-discrimination, and social goals, such as social cohesion and diversity. As a counter-balance to individual choice (however well-informed) the DRC believes that:

- All children should be welcomed into the world and provided with appropriate levels of social, practical and financial support.
- Human diversity is a cause for celebration and it should not be eliminated by discriminatory assessments of people’s quality of life.

Similarly, the influential, left-leaning think tank, the IPPR recommends: “A greater emphasis on positively welcoming children and adults affected by genetic conditions into our society and de-emphasising the link between genetic tests and abortions would be the best way of ensuring that genetic services genuinely facilitate informed choices.”(DRC 2001:21)
Cultural lag, in the context of Huxley's "Brave New World" and the movie, "Gattaca", this author would argue, places not just the disabled, but, in the long run, the entire human race in the position of oppressed minority, and the dream of the genetically pure Perfect Body – Stelarc’s Posthuman modular body, perhaps – as the innovation of the future. Our uniqueness on the anatomico-genetic level, however, serves, on the contrary, to imply that such a notion as a ‘perfect body’ must necessarily be heavily political, contingent, and socially constructed. The innovation of the future is not inevitable – especially when so large a proportion of society – all of us – is consigned to the position of the oppressed, atavistic, and lagging behind. When the naturally born are regarded as disabled, then society no longer serves the people who make the social; society has then become totalitarian, and serves the interests of a powerful elite to the detriment of the greater populace. We are only ‘obsolete’, in short, in the eyes of such an elite, and the cyborg stories are not only a reflection of our anxieties but a warning to us all to wake up to the drift of history and get a grip on the reins before it is too late.

(E) Ballard's Crash

This medicalisation of the human body - the reduction of life to the fleshy jigsaw-puzzle conceived by anatomy - brings our self-concept as a species, in the late 20th and early 21st centuries, to the point where there seems little to distinguish between a hospital and a motorcar body-shop. This image reminds one of Stelarc’s world of the modular body, again, and Kac’s A-positive, where human body and robot exchange fluids. In the surreal world that Ballard paints for us in his novel, “Crash”, (Ballard 1995) the boundary between flesh and metal is breached in an erotic fantasyland uniquely redolent of the boundary-transgressing nature of the cyborg. We are back in the land of Ogburn’s most often-cited example of cultural lag – the automobile. But the issue of congestion is key to Ballard’s novel. The car crash in particular is the scene of untold erotic possibilities for the characters of Ballard’s unsettling story. "For Vaughan,” Ballard tells us, "the motor-car was the sexual act’s greatest and only true locus," (Ballard
1995:171) or, put another way, "It isn't sex that Vaughan is interested in, but technology." (Ballard 1995:116)

Not that Vaughan is pre-meditated or even truly conscious of what has grasped his life. "He stared down at his half-erect penis, looking back at me in a muddled way as if asking me to help him identify this strange organ. He placed it against the right-hand front wing of the car, and with the chalk drew its outline on the black cellulose." (Ballard 1995:168) The sense of alienation from the reality of one's own body is stark. The body of the car, indeed, seems more real. The car and especially the car crash are the focus of the novel's erotic world, into which the characters are drawn with the power of an obsessive sexual fantasy that rips them away from 'normal' life. "The crushed body of the sports car," Ballard tells us, as Vaughan stares longingly at the aftermath of a crash, "had turned her into a creature of free and perverse sexuality, releasing within its twisted bulkheads and leaking engine coolant all the deviant possibilities of her sex." (Ballard 1995:99) The characters visit breakers' yards, to sit in the broken hulks of cars towed away from crash zones: "Sitting here in this deformed cabin, filled with dust and damp carpeting, I tried to visualise myself at the moment of collision, the failure of the technical relationship between my own body, the assumptions of the skin, and the engineering structure which supported it..." (Ballard 1995:68)

The erotic potential of the motorcar goes beyond the sexually alluring nature of certain kinds of clothing. This is not about metal lingerie. There is something altogether more cyborgian about the relationship between flesh and metal in Ballard's book. The car is more of an exoskeleton, a new body part/organ that encloses yet does not hide us - on the contrary, it liberates us to travel great distances at speed and in comfort. It has all the posthuman caché of being mass produced, perfect when it comes off the assembly line. Yet when we bump into one another, in these perfect exoskeletons, when the haphazard and unpredictable - perhaps 'fateful' - eventuality of the accident occurs, the marks the impact makes upon our flesh are more than the imprint of elastic upon skin. It is not just the broken, scarred bodies of those inside a crash between these perfect
exoskeletons, but the disabled car itself, the crushed, broken, splintered bodywork and leaking fluids of the car that attracts the fascination of the central characters. These metal skins, and the unplanned, anonymous sexuality of their meeting, exhibit a powerful and violent passion. The body, not fashioned in clay, not sewn together from the products of the dissection table, not eugenically engineered as a standard model, has become, in Ballard's book, a body with a new, metal skin, and the brooding fear that runs throughout the book of what Ballard terms "autogeddon" (Ballard 1995:50, 73, 76, 106) - some huge, final, genocidal crash - seems an inevitable outcome of the growth of this new inorganic organ. This, indeed, is a stark warning: that we seem to be embarking upon the growth of such a metal skin, and that if we persist in this, some awful 'autogeddon' awaits us.

The numinous world of pre-Darwinian Vitalism, of worship and faith, has, in Ballard's novel, most tellingly, become merely the cult of celebrity. "Vaughan dreamed endlessly of the deaths of the famous, inventing imaginary crashes for them. Around the deaths of James Dean and Albert Camus, Jayne Mansfield and John F. Kennedy he had woven elaborate fantasies. His imagination was a target gallery of screen actresses, politicians, business tycoons and television executives. Vaughan followed them everywhere with his camera." (Ballard 1995:15) As Ballard says in an interview: "The celebrity theme is important in the book because of the celebrity culture that has developed in the last thirty or forty years. It's a very important part of the mass imagination."

This cult of celebrity is one of the many symptoms of what Baudrillard describes as hyperreality - how, in the modern world, the world as given as images on television and computer screens, is the reality. (Baudrillard 1975) and (Poster 1995) This media reality has not only displaced the original reality but has transcended it, has become more real than real - as Ballard says in the introduction, "...the balance between fiction and reality has changed significantly in the past decades. Increasingly their roles are reversed. We live in a world ruled by fictions of every kind - mass-merchandizing,
advertising, politics conducted as a branch of advertising, the pre-empting of any original
response to experience by the television screen. We live inside an enormous novel."
(Ballard 1995:4)

Somers' comments upon the power of narrative return to mind – 'a world ruled
by fictions of every kind' in which 'politics [is] conducted as a branch of advertising'
indeed rings so very true.

In terms of the notion of cultural lag Ballard's cyborgian relationship between
flesh and metal is an outgrowth of a deep-set anxiety about the whole drift of modern
culture, the hyperreality of the world as reflected back to us by the media, the sense that
our innermost selves have been moulded in the car showroom, and the uncomfortable
sense that some inevitable 'autogeddon' awaits us. The oppressed minority left behind
by innovation, in this case, is perhaps our real, truest sense of self.

(F) William Gibson

William Gibson's "Neuromancer" (Gibson 1993) and the other books associated
with it set out a cyberpunk world that is, indeed, an enormous and unreal novel. A
range of different cyborgs are commonplace. There are Artificial Intelligences - big
mainframe computers with Swiss citizenship; there are creatures, among others, such as
Molly:

She wore mirrored glasses... He realized that the glasses were surgically inset,
sealing her sockets. The silver lenses seemed to grow from smooth pale skin above her
cheekbones, framed by dark hair cut in rough shag. The fingers curled around the fletcher
[gun] were slender, white, tipped with polished burgundy. The nails looked artificial... She
held out her hands, palms up, the white fingers slightly spread, and with a barely audible click,
ten double-edged, four-centimetre scalpel blades slid from their housings beneath the
burgundy nails. She smiled. The blades slowly withdrew. (Gibson 1993:36)
...and cyber dogs:

The first of Rudy's augmented dogs picked them up... A lean grey hound regarded them from a high clay bank at a turning in the road, its narrow head sheathed and blinkered in a black hood studded with sensors. (Gibson 1993:185)

But the character of Virek is perhaps one of the most interesting – little more than a brain in a vat of chemicals where he has been living for over a decade, Virek, the multi-billionaire, is perhaps the ultimate capitalist, in Gibson's world. At one point he relates a conversation about Virek as a latter-day Howard Hughes, and about corporate evolution, saying that Virek "talks about corporations as if they were animals of some kind." (Gibson 1993:196) The inhumanity of the rich, as a trope in modern societies, is perhaps a theme Gibson is bringing to the fore with this character. "For an instant, she stared directly into those soft blue eyes and knew, with an instinctive mammalian certainty, that the exceedingly rich were no longer even remotely human." (Gibson 1993:29)

Gibson's world presupposes a fundamental affinity between carbon-based neural activity and silicon-based digital activity, which makes possible a direct interface between the two. (Perhaps Organic Chemistry, now studying both elements, will solve this problem one day? Richard Norman believes it. But not so, according to Susan Greenfield.) This interface includes the Sense/Net, the 'simstim', and 'microsofts'. This brain/computer direct interface, apparent in all of Gibson's work, enables one to 'jack-in' to cyberspace and experience it with all of one's senses in an internalised virtual reality - one literally plugs either chips (microsofts) or 'cyberspace decks' into a jack plug set into one's skull behind the ear. One can then either travel in cyberspace using the deck to navigate, or play back 'simstim' soaps or films into oneself. This interface makes possible such a thing as a 'construct' - like the character Dixie Flatline. He is dead, but a digital recording of him is available that can interact, as if alive, in the simstim environment - surely one of the strangest cyborgs of all. But even Gibson includes some doubt about
this world: "The sinister thing about a simstim construct, really, was that it carried the suggestion that "any" environment might be unreal." (Gibson 1993:197) Baudrillard's hyperreality enters, stage left.

Echoing Lang, in this world of Gibson's, the body is regarded as rather passé. Neuromancer's main protagonist, Case, has made a living from 'jacking-in' to cyberspace, until he made an enemy of his employer:

They damaged his nervous system with wartime Russian mycotoxin... The damage was minute, subtle, and utterly effective. For Case, who'd lived for the bodiless exultation of cyberspace, it was the Fall. In the bars he'd frequented as a cowboy hotshot, the elite stance involved a certain relaxed contempt for the flesh. The body was meat. Case fell into the prison of his own flesh. (Gibson 1993:12)

Gibson gives a neat potted history of this hyperreal world, which he dubs, 'The Matrix':

'The matrix has its roots in early arcade games,' said the voice-over, 'in early graphics programs and military experimentation with cranial jacks.' On the Sony, a two-dimensional space war faded behind a forest of mathematically generated ferns, demonstrating the special possibilities of logarithmic spirals; cold blue military footage burned through, lab animals wired into test systems, helmets feeding into fire control circuits of tanks and war planes.

'Cyberspace. A consensual hallucination experienced daily by billions of legitimate operators, in every nation, by children being taught mathematical concepts.... A graphic representation of data abstracted from the banks of every computer in the human system. Unthinkable complexity. Lines of light ranged in the nonspace of the mind, clusters and constellations of data. Like city lights, receding....' (Gibson 1993:67)

It is interesting to note that the most crucial element of all this - the 'cranial jacks' - derived from military experimentation. As we shall see later, Gibson's insights here are not far off the mark.
However, Gibson's world makes a fundamental assumption - almost, one might say, an 'absolute pre-supposition' (Collingwood 1972) - that consciousness, identity, selfhood, etc can be divorced from, separated from, and exist beyond and outside of the body. It equates the former with information, in a digital sense, and grants it the quality that information has been granted (in the last century) - of being a pattern, and a pattern only, that has no substance, and is free to flow from place to place along suitable conductors. (Hayles 1999) One is reminded of Abernethy's "superfine fluid 'analogous to electricity'." (Shelley 1994:xviii-xix) Given this pre-supposition, it is possible for Gibson to include a sub-plot in Neuromancer in which a Voodoo sect (involving 'horses' ridden by 'snakes') is able to navigate in cyberspace through a form of ritually (and chemically) induced astral travel. Dixon's observations on Stelarc's spider-like Exoskeleton come to mind. The traditional, pre-Darwinian, vitalistic realm of the spiritual world is here directly equated with cyberspace. Take away the pre-supposition that our mental faculties are translatable from brain-matter to digital information, and move the voodoo context slightly further east, and Neuromancer becomes pure Bollywood. The Wig explains how, uncannily like a Sardu, "his technique of mystical exploration involved projecting his consciousness into blank, unstructured sectors of the matrix and waiting." (Gibson 1993)

(G) The Matrix

Almost in homage to Gibson's work, the Hollywood movie, "The Matrix" presents a reality that is deconstructed before our eyes, and the performative potential of our actions is laid bare in a world of virtual reality as hyperreal as any Baudrillardian fantasy could be. Bridging the already familiar Gibsonian elision between the psychic and the digital, human beings encased in pods stacked miles high in underground bunkers have massive jacks inserted into their brainstems - Ferrari's to the Utah array's go-cart - and are thus plugged into vast computers, and act out the characters in a gigantic simulation of late twentieth century American culture - a nightmare indeed. A hero arises to fight for enlightenment and freedom from the chains of microelectronic maya, plucked like
some reincarnated Lama from the masses by the outlaw priesthood of the true path. Yet this is no sentimental romance for the eagle and flag. For here in The Matrix shine the possibilities inherent in the awareness that all that we are is an act. The notion of Cultural Performance is here taken to its logical extreme, and the root suggestion that Reality itself is an Act – a consensual hallucination like Gibson’s cyberspace – is presented to us, on the screen.

If the personalities we identify as our Selves are in fact products of the Public Relations machine, and the objects we purchase to express those selves are but puppets of the truth-creation machine that has given us the Modern world, if indeed all that we are and know and have is actually man-made, then the world of The Matrix is not so far from the truth after all. According to Butlerian Performativity, being is doing and to do is to be, our minds and our bodies are indivisible concurrences distinguished only like the faces of a coin. So if all that we do is also part of Latour’s heterogeneous network of things and people where each coin is the very fabric of the political economy, then it is indeed possible that in the end the ‘spoon’ which the characters in The Matrix try to play with really is not there, in that ‘absolute’ and ‘objective’ sense that we persist in persuading ourselves to believe, that the spoon is as much our imagination as it is fact; that perhaps – if Professor Llinas is to be believed - it is more imagination than fact, though surely and irrevocably a fact nonetheless.

Professor Llinas would have it, from his studies of dreaming and wakefulness, that our brains are in actuality in a constant state of dreaming – "they are continually generating images to manufacture the world inside our heads." He asserts, "The outside world is a projection, you put it there. It is not happening out there, it is happening inside your head. It is, in fact, a dream, exactly like when you fall asleep. We need to see, we need to perceive, we need to dream actively – because this is the only way we can take this huge universe and put it inside a very tiny head. We fold it, make an image, and then we project it out." (Greenfield 2000:75) Imagination and normal vision, it would appear, are separate but overlapping brain processes, and our visual experience
"is a kind of mixture of information coming in from the eyes and prior association." In short, "we see things with our brains, not our eyes." (Greenfield 2000:79)

If this is so, then the world of the Matrix is our world. We live in a consensual hallucination that is the human interpretation of the universe, and with our minds collectively construct a Reality that makes sense of it all, and of us. This collective construct, moreover, like the set upon a stage, is the arena of our cultural performances, and the props and flats and puppets the Objective reality we represent to our Subjective selves. To the pre-Modern eye, there was a sense of connection, a sense of origins, a belonging to some great chain of being that linked us and everything together. To the Modern eye, both we and the objects around us float free as but tiny islands in a universe that is at once both too vast to contemplate and yet discoverable, revealing its secrets to us and to our ingenuity and craft. But the Modern hallucination lacks any moral message, any spiritual comfort, as Rorty puts it, lacks any sense of the whole of which we are a part. Perhaps the pre-Modern consensual hallucination had its merits after all.

Is not after all this Matrix, in which Keanu Reaves and his accomplices play out their Game Boy fantasy, a perfect figure for the world of Intellation of which Bergson spoke, the hyperreality of which Baudrillard warned us, and to which Virilio's picnoleptic path leads? (Virilio 1997) Are not the computer-game-constructs, the 'Agents' who protect the Matrix, denizens of de Landa's future world of machinic historians of science?

The cyborgs of the Matrix are more akin to Professor Norman's telepresent paraplegics, prone, unconscious, farmed like battery hens, living out virtual lives in a virtual world in the weird fictional non-space where neural and digital meet and interface seamlessly. Speaking of artificial intelligence, Professor Greenfield admits, of course, that "artificial neural nets can learn too, but an important distinction is that the mechanism is fundamentally different. Biological neurons don't just change the strength of connections, they grow new connections and let the old ones atrophy — they change their physical
shape. In other words, hardware is indistinguishable from software.” (Greenfield 2000:103) Hayles' matter/information unity, no less. So downloading one's consciousness, one's memories onto a CD-Rom for posterity is just so much fiction – let alone the Gibsonian cranial jack, or the battery-hen human of The Matrix. If, as she concludes, "every memory exists in a nested grouping of other memories, which, in turn, rely on the integrated operations of the whole body, then no memory could be accurately downloaded unless the whole body was too." (Greenfield 2000:197)

Comforting though it may be to hear from Professor Greenfield that what Gibson and The Matrix envisage is just not good neuroscience, the implications of this fiction are nonetheless clear: that 'alienation' in the postmodern world, has become total.

iii. Cyborgs in Fact

I) Gaia

James Lovelock, the NASA Space-Scientist and Mars expert, and his famous Gaia hypothesis about the living Earth, is the subject of fervent theorising by one of cyborgology's most radical voices, Donna Haraway. In this instance the voice of radical feminism is heard attempting to appropriate the cyborgian products of scientific materialism for the furtherance of the counter-cultural agenda. This approach is somewhat far-fetched.

However, her picture of the cyborg as a potential locus for post-gender oppositional social posturing aside, Haraway nonetheless makes some very relevant contributions to the cyborgological debate. For Haraway, "Lovelock's earth - itself a cyborg, a complex auto-poietic system that terminally blurred the boundaries among the geological, the organic, and the technological - was the natural habitat, and the launching pad, of other cyborgs.” (Haraway 1995:XII) Now, she herself admits that their world-views are poles apart. "Lovelock's perception was that of a systems engineer gestated in the space program and the multinational energy industry and fed on the
heady brew of cybernetics in the 1950s and 1960s, not, say, the intuition of a vegetarian feminist mystic suspicious of the cold war's military-industrial complex and its patriarchal technology." (Haraway 1995:XIII) Nonetheless, for Haraway, the cyborgian nature of Lovelock's Earth is inextricably bound up with the cyborgian nature of present-day humanity, and she has a point: "Man is, by self-definition," — and self-definition, as we have seen, is exactly how modern Man has come about — "a globalising and, therefore, global species. The people who built the semiotic and physical technology to see Gaia" — from Space - "'became' the global species, in which they recognised themselves, through the concrete practices by which they built their knowledge." So far so good. Furthermore, she continues, "This species depends on an evolutionary narrative technology that builds dramatically from the first embryonic tool-weapon wielded by the primal hunter to the transformation of himself into the potent tool-weapon that seeds other worlds." It is implicit, here, that for Haraway there is an equivalence between the phallus and the "tool-weapon" she refers to, and that the Enlightenment project of scientific progress that we have identified and critiqued in this thesis — and concur is driven by a masculine persona performed by gentlemen of a certain class - is something that she believes began when, as a species, we came down out of the trees, and has been led by patriarchal male figures from the very start. In the opinion of this author this is both an incorrect assumption, and a slight upon the matri-centric cultures that predominated around the world (according to many anthropologists) for millennia before the advent of patriarchy. Nonetheless, her picture of modern Man since the first US picture of our whole planet was sent by Apollo 4 back to earth from 9,850 nautical miles above its surface, on November 9, 1967, is compelling. "To see Gaia," she summarises, "Man learns to position himself 'physically' as an extraterrestrial observer looking back on his earthly womb and matrix." (Haraway 1995:XIV)

This first glimpse of "what the earth looks like from the only vantage point from which she could be seen - from the outside, from above," is indeed an immensely important moment in our history. As Haraway asserts, "Gaia is not a figure of the whole
earth's self-knowledge, but of her discovery, indeed, her constitution, in a great travel epic. The signals emanating from an extraterrestrial perspective, such as the photographic eye of a spaceship, are relayed and translated through the information-processing machines built by the members of a voraciously energy-consuming, space-faring hominid culture that called itself Mankind." (Haraway 1995:XIV)

Thus Haraway's most important contribution, as far as the drift of this thesis is concerned, to the field, is her vision of the cyborg as not only the potential space-man of the future, as delineated by Clynes and Kline when they first coined the term, but as constitutive of Space-Age Man, cyborg-Son of the Cyborg-Mother Earth, first seen – and identified - from space in the 1960s. The significance of this moment is perhaps most compelling in its potential interpretation as a 'singularity' in Haraway's "evolutionary narrative."

II) Space-Age Man

For an understanding of this interpretation, and of what is meant by a 'singularity' in this context, we must turn to DeLanda (DeLanda 1991) and his use of a concept by Deleuze and Guattari. DeLanda, in his fascinating book, "War in the Age of Intelligent Machines," takes the imagined future view of a robot to look back on the development of artificial intelligence, with the role of humanity little more important than that of insects in the pollination of plants. He takes Deleuze's (Deleuze and Guattari 1987) notion of the "machinic phylum" - a process "in which order emerges out of chaos as a result of non-linear dynamics: rivers and tsunamis in the hydrosphere, wind patterns and storm systems in the atmosphere and so on," (DeLanda 1991:20) The special moments in the machinic phylum when order does emerge from chaos are called 'singularities', and are perhaps most recognisable as 'phase transitions', like when a liquid suddenly solidifies upon reaching a certain temperature. When sufficient impetus for change has built up within a system to bring about such a radical alteration in structure a
process of self-organisation ensues and a new coherent pattern radically different from the disordered state that prevailed before, emerges. As DeLanda tells us:

"Surprisingly, all these different processes, at the onset of self-organisation, have turned out to have similar mathematical structures. The process through which the photons in a laser undergo a spontaneous organisation and become coherent (all 'cooperating' to emit light of the same phase) has been found to be essentially similar to that of molecules in a liquid 'cooperating' to form eddies and vortices, or in a different case, crystalline structures." (DeLanda 1991:15)

DeLanda then proceeds to sketch out, from the perspective of his future robot historian, a history of the non-human, of the technological, through the gear-shifts of such new orders, arising out of the chaos of much spontaneous tinkering by many human actors. As he admits, the "application of these concepts to the study of human history remains controversial." However, their use in the understanding of the evolution of armies has not been overlooked by the military: "the outbreak of armed conflict is, mathematically speaking, related to the events at the onset of turbulence." (DeLanda 1991:21)

Supposing, for a moment, that the military-industrial-academic complex of late-twentieth century, globalising western culture, can be seen as a totality in the light of an image, say, such as that of a stream gaining speed, only moments away from the onset of turbulence, one might take Haraway's insight into Space-Age Man -- the moment Mankind reached a, necessarily cyborgian, planetary self-awareness -- and with DeLanda's eyes, see how it might be regarded as a 'singularity' -- the moment in the development of human tool-use and technological advance when the human element became subsumed within a human-machine-planetary system to such a critical extent that the notion of 'tool-use' ceased utterly to be an accurate description. Planetary self-awareness of this order of magnitude and complexity is achievable only through the surrendering of one's biological autonomy to the technological envelope that enables mankind to observe the
Earth from without. Knowledge of the flavour, ‘strawberry’, only comes about when human and strawberry combine – the one consuming the other. Knowledge of the Earth from without only comes about when Man has been consumed by his technology, and fired into space.

One could argue, with Latour (Latour 1993), and even Baudrillard (Baudrillard 1990), perhaps, that a singularity such as the human-machine-system, granting a new, planetary self-awareness, has been long in the making. Perhaps such a singularity might be seen rather as something spanning a few hundred years than a single instant. Step back far enough, to see the many thousands of years of human social evolution and the gradual development of the machinic phylum, as so vividly evoked by DeLanda, and a singularity may indeed refer to a single millennium! But following DeLanda’s arguments about singularities further, as when the agitation and turbulence of boiling water suddenly reaches the shift in state from liquid to gas, as it turns to steam, so perhaps the evolution of the machinic phylum must reach a critical point at which it ceases to be merely a social fabric, an environment curtailing, boxing, shaping the possibilities of our being-doing, and becomes something new and all-embracing of which we are a part, a boundary-collapsed network of human and non-human actors no longer in any sense under either our control or that of the ‘machine’. Such a moment, albeit in the midst of a centuries-long shift, might nonetheless occur in a matter of days: in November 1967, perhaps.

Certainly the phenomenon of cultural lag will ensure that the vast majority of humanity will have hardly noticed such a gear-shift in our long evolution. But the innovatory cutting-edge of the continuing Enlightenment narrative that took humanity into the Space-Age in the late 1960s may yet bring us all with it.
(A) The Terminator

DeLanda’s perspective of projected robotic hindsight moreover, and the continual military undertone in our discussion, (which will gradually become much more overt as this second section of our third chapter unfolds) lead us to one of the most famous and popular cyborgs of contemporary western culture: James Cameron’s “The Terminator.” (Cameron 1984)

Paradoxically, perhaps, one crucially important thread running through the film is the nature of the body. The Terminator is naked when he appears from the robot future through the time-tunnel. We admire [Schwarzenegger’s] extreme masculine figure, the massive musculature; we are tantalised, through non-disclosure, with the possibilities of his sex. We are shown his buttocks and thighs in half-light. This is a highly sexualised image of hyper-masculinity, an out-of-proportion superman. Progressively, this strange and almost brutal male beauty, however, is subverted during the course of the film by the gradual tearing away of the fleshy outer casing of the cyborg. First part of the forearm, then an eye, are revealed as the mechanical / computerised robotics that exist just beneath the skin. This rugged male beauty really is skin deep. Eventually, stripped of all the outer fleshy casing by fire, the robot core of the cyborg is all that is left. Several cultural strands are here combined in one: the nude in society; the representation of male nudity, as a sub-division of such a history; the related field of gymnastics, and the tradition of the Strong Man; the narrative trick of misrecognition - so essential to melodrama - and the related problem of deceptive appearances: knowing the true inner workings of what seems, on the surface, to be familiar; the seductive thrill of the anti-hero whose power combines the best of human physicality and mechanical achievement, as well as the worst of destructive motivation.

But, most importantly, The Terminator is a cyborg of a very different nature to those we have so far dealt with. The Terminator belongs, in fact, more to the Space-Age Human-Machine system we have just been discussing, than to the group of twentieth
century cyborg peoples in Metropolis, Brave New World and Gattaca, let alone along with 
Frankenstein's Creature. The Terminator is part-machine, part-human, rather than part-
human, part-machine. The Terminator is, in fact, a part-human machine, and not a part-
machine human. Indeed, The Terminator does not even display so simple a human trait as an identity: The Terminator is an 'it'; an object; a thing, unthinkingly executing a programme of action. In particular in the sequel, Terminator 2, the Schwarzenegger figure, for all that it appears to be on the 'good' side for a change, remains programmed – now by the opposition - in a more Golemic way, perhaps: a dangerous thing of technological clay, programmed to save the oppressed rump of humanity from the persecution of the artificially intelligent machines who in the imagined future of the film are soon to rule the world, and who create The Terminators as tool-weapons to infiltrate human society using their fleshy exteriors as cover. “The Terminator is not endowed with the status of human precisely because it is a purely material(ist) object with no self-identity... Significantly, it never really understands why John Connor will not let it kill human beings, although it obeys his orders and refrains from so doing.” (Holland 1995:159)

Holland has some particularly interesting insights into the phenomenon of the Cyborg sci-fi movies that came out of Hollywood in the 80s and 90s, in his article, “Descartes Goes to Hollywood: Mind, Body and Gender in Contemporary Cyborg Cinema.” The concept of pain, he remarks, “is invoked as a sure signifier of human-ness in the cyborg film.” The quintessential part-man/part-robot figure of the cinema, Robocop, for example, demonstrably feels both emotional and physical pain - especially in each of the first two Robocop films' mutilation sequences: “the scenes in which Robocop is ripped apart by Cain's gang echo this original sequence, and as some oil-like substance splatters from his mechanical insides onto his baby-like face...[the technician says.] 'Don't tell me he can't suffer.'” However, “the human-looking cyborgs in the Terminator films feel no pain of any sort.” As Kyle, father of John Connor in the weird time loop in which the movies are set, says “‘Cyborgs don’t feel pain. I do.’” The Schwarzenegger Terminator in
the second film says: "I sense injuries. The data could be called pain" - but it precisely isn't pain in the human sense. Emotion and pain, perhaps, here reveal the core difference between humans and machines: human desire. (Holland 1995:162)

But the nature of desire and the difference between human and machine is something we must return to later. For now, it is the notion of war, the dystopic vision of a future artificial intelligence seeking to annihilate humanity, that we must pursue. To do this, we must first spend a while examining the nature of war, and the critical approaches to the subject offered by the post-structuralist turn, and then travel direct to the capital of the world, for a conference set up and run by the US Department of Defence.

III) War

For Virilio (Virilio 1997) the first walled cities were spaces of war, where defence was a matter of slowing things down; roads between cities and across territories were (often quite literally, as in the case of the Romans and Napoleon) the products of war, where attack was a matter of speedily transporting warriors and supplies – the projection of power. This author does not concur with Virilio's assertion that it was war that brought about the first civilisations (those that we know of) – there is ample evidence that trade and religious castes were there first – but many of his ideas on speed and war are valid nonetheless. Virilio speaks of "The social and political role of stopping...[he uses sleep as an example].... It's because there is an interruption of knowledge that a time proper to it is constituted. The rhythm of the alternation of consciousness and unconsciousness is 'picnolepsy', the picnoleptic interruption (from the Greek picnos, "frequent"), which helps us exist in a duration which is our own, of which we are conscious...." The picnoleptic in architecture is the delineation of space, the staking out of the boundaries of the settled self. The wall says: 'Do not pass.' It is an act of war.
DeLanda speaks – in related terms – of two differing traditions in war, that of the nomads and that of the sedentaries, and how until the advent of firearms the nomads’ advantage of shock and speed always triumphed over the sedentaries’ tactic of the phalanx – walls can be overcome. Firearms, combined with the economic conditions necessary for their manufacture, brought about the overthrow of the nomads. Yet when the technology of firearms reached the precision of the conoidal bullet the “tight formation and linear tactics” (DeLanda 1991) of the phalanx – walls of soldiers - was no longer viable, and the nomadisation of sedentary armies ensued, with small flexible units becoming the norm.

It would seem, however, that a new singularity in the art of warfare is being breached. Certainly Mr. Bill Brower, of Fort Belvoir, described the current advances in military technology as a military revolution of the order of the railroad-rifle-telegraph revolution in the nineteenth century, and the airpower and nuclear revolutions in the twentieth – both of which could be viewed as singularities in the machinic phylum. [See Appendix]
In March 2000 the author attended a 'Teaming Workshop' in Washington DC, set up by DARPA, the US Defence Advanced Research Projects Agency (the people who gave us ARPANET, and thereby the Internet) on Exoskeletons for Human Performance Augmentation (EHPAs). The morning sessions were given over to talks from members of the armed forces, variously outlining what they felt they needed, and the afternoon sessions to scientists from around the United States, variously outlining the current status of their research in the many areas relevant to the subject. Of most interest to this thesis were the morning sessions, during which the current thinking amongst military strategists in the world's only remaining super-power and global policeman was laid out clearly.

Dr. Ephrahim Garcia, from DARPA, with $50million in his pocket, ran the show. He was the buyer, the armed forces representatives were the customers, or end-users, and the scientists were the suppliers. It was an interesting Trade Fair, and as the lone sociologist the author felt variously like a fly on the wall, or a spy from the other side... This military-academic-industrial complex in miniature seemed to speak volumes about the ways in which science – in this field at least - acts as the 'handmaiden' of technology. DARPA undoubtedly wields more hard currency than most other sponsors of academic research, and the leaders of schools and institutes funded to undertake military research projects undoubtedly set the academic tone for many others in their field. If the military aren't interested in what you are researching, alternative funding opportunities may be scarce. This is reminiscent of Kuhn's (Kuhn 1970) analysis of the growth and maintenance of 'schools' of thought based upon professorial patronage. Here, in the world of technological applications of advanced biomechanics, the professors, in turn, benefited from the patronage of the military. One could see how the policy of the US DoD could quite literally lead the world's scientists and technologists down the paths it chose for them, with dissenting voices on the fringes simply unable to fund their
research, and thereby attract other researchers, PhD students, and a place in the allocation of academic resources.

Garcia opened the event with some remarks concerning the nature of the conference. The 'program' as he called it, was "to develop the enabling technology to build an exoskeleton." The DARPA program would consist of three-to-four developmental years, with full exoskeletons in use in 2005. He sought an exoskeleton that would be, to the soldier wearing it, like "a bicycle going downhill." He stressed that he was "not going to embed chips in anyone's brain, at least." He joked about people who already believe they have chips in their brains - "maybe it won't be that hard to sell," he quipped, to general laughter. Neuro-mechanical communication through sensors, he felt, was an important area for research, but, in seriousness, he did not envisage "skin-penetrating electrodes" being viable.

**(B) Brain and Chips**

Joel Burdick's neuro-prosthetic experiments on monkeys using Professor Norman's Utah Array, mentioned earlier, aside, Prof Norman himself is confident that potential military applications of his work are unlikely.

Prof Norman: The reason they're afraid of this is if in fact there's any sense in enemies of the United States that there are chips implanted in people's heads - a pilot who is shot down or an infantryman who is caught, will immediately go through neuro-surgery while they take this chip out, and they just don't want to have that threat, to their infantrymen and their pilots and whatever.

Fair enough. But what about neuro-mechanical communication through sensors? Norman is not optimistic that such technology is near at hand. Indeed, he seems fairly sure that "it's not going to happen." His reasoning is clear. A simple movement of one's arm, for example, is likely to involve the firing of "probably 20,000 neurons." Currently, with the array technology that he has so far developed, he can listen to 16 of those...
neurons, and get a different "signature" from moving one arm than he gets from moving the other. For anything more complex – like say the movement of a trigger finger – he might need to be listening in on 500 neurons, and directly, through his implanted array technology. This is very different from trying to listen in to even 16 neurons from outside of the skull – a "big sort of low-pass filter of spatial information."

Norman describes the state of the technology currently in development that attempts to read neural firing through this skeletal filter. There is, he says, such a thing as magneto-encephalography – which he describes as "super-conducting little coils that measure magnetic currents inside your head." They have one of these devices where Norman works, in Utah, which can measure small electric currents which are associated with thoughts in the brain. However, this is "a huge device. It looks like a hairdryer on a scale of about 10 - this gigantic thing that fits over your head." It can measure small currents associated with various sensory activities in the brain – currents associated with visual or auditory activities that seem to appear localised to certain areas of the skull. But this is more a kind of "global mapping" than the "high-resolution mapping" that would be required to recognise the difference between moving one's left arm or one's right arm. Progress is apparently being made in these areas but Norman does not foresee this technology ever being able to achieve sufficient resolution to map individual neurons, which is what the implant system is capable of, and which makes control possible. Miniaturisation of the technology, of course, would also need to occur, and there seems little prospect of that either, in the foreseeable future.

All this, of course, if you believe, with Norman, contrary to Greenfield's assertions, that knowledge of what individual neurons are up to gives you insight into what the brain is actually doing. But, Norman is sanguine about his technology. "As sophisticated as our system is," he says, "I still think it's kind of a band-aid solution and I'm not that proud of it." His assessment is that it's the best that will be available for a decade, maybe two. So the neuro-mechanical possibilities of Garcia's EHPAs are not
about to appear on the horizon. However, the more straightforward bio-mechanical aspects of the exoskeletons being discussed at this conference most definitely are.

John Steakley's characters, in his cautionary novel "Armour" (Steakley 1984), - a seemingly direct reply to Heinlein's more famous "Starship Troopers," (Heinlein 1975) are quite relevant here. The central character in the book finds himself completely changed, almost schizophrenically, when subsumed into the human-machine system that he becomes when he wears his battle armour.

Bearing Steakley's pathological man-armour identity in mind, what did Garcia think about the psychological issues raised by the battle armour he was proposing? This author was able to put the question to him. In his reply, he made it clear that he believed that the "potential mind-set problems," as he called them, of becoming part of a human-machine system, might indeed end up as a factor narrowing the use of such systems to shock troops, rather than wider issue to all military personnel. Yet he believed that this technology has reached its time, and as a purchaser of advanced technological research for the American government, he was concerned to see if it can work, first, if the military will buy it, second, and only then, through pilot studies, begin to address socio-psychological factors. A very telling series of priorities. But perhaps most telling was the sense that this technology "has reached its time." The sense of a singularity in the machinic phylum seemed to fizz around the hall.
(C) Soldier as a System

Mr. Chris Kearns, from Fort Benning, an Army representative, spoke about "Army Combatant Needs and Requirements" on the first morning. Very specifically, he introduced the audience to a development in military thinking initiated during the 1980s and set down on paper in the Army Science Board Report of 1991, laying out the concept of the Soldier as a System. The thinking grew from the understanding that there are human-machine systems, machine-computer systems, and human-computer systems all at work in the overall make-up of the modern soldier, and it became increasingly apparent that an integrated systems approach was needed, acknowledging the fact that changes in any one area affect one or more other areas of the overall system.

Following the Army Science Board Report and culminating in formal announcements in late 1998, the LAND WARRIOR SYSTEM came into being. Mr. Kearns talked to us about Robert Heinlein's "visionary" novel, 'Starship Trooper', as a fictional precursor to the Land Warrior System, which was "worth reading" because the new system was already there, in some respects, nearly there in some respects, and soon to be surpassed in other respects, in the pages of this novel.

Cyberpunk fiction in R. and D! He talked about the key Performance Parameters for a Land Warrior System, citing: an integrated helmet assembly, a weapon system, a computer/radio subsystem, a software subsystem, and a protective clothing and individual equipment subsystem.

For Kearns, the basic requirement of an exoskeleton is that it weighs nothing, takes up no space, and does everything. It must decrease stress, not increase it. "An Exoskeleton is an outer skin that soldiers wear, not a new, small, individual platform that soldiers operate."
Kearns stressed that one of the foremost and crucial aspects of the 'Soldier as a System' was that it brought to the soldier what every other aspect of the military had enjoyed for many decades – Uniformity / Standardisation. After historically being always a mixed bag of tall and short, stocky and lithe, more brainy or more brawny – in short, individuated – human beings, the infantry could become 'Equalised' and thereby more predictable and thus easier to plan with. The prospect of the Land Warrior System incorporating (pun intended) a full exoskeleton, or 'ectobionics' (the Army preferred term) was clearly exciting to Mr. Kearns.

This certainly suggests nightmare visions of the 'Citizen as a System' – soon to be in R and D. The institutionalised thinking behind the Land Warrior System was stark. Cybernetics and systems theory, at the service of the military, deliberately setting out to create what was heretofore a creature of science-fiction. If, as Virilio maintained, the development of the private car had been driven by the military, after the First World War, to prevent the farce of empty tanks lying unused on the battlefield because only the officers knew how to drive, how long before exoskeletons replaced the private car (Virilio 1997)?

Mr. Bill Brower, Fort Belvoir, described a wireless LAN with internet-based control from behind, and monitors for all systems including human physical monitors. He also pointed out the psychological problems that need to be addressed, citing pilots as an example, who sometimes black out in hi-G situations and have a dislike of physiological monitoring because they like to keep such vulnerabilities quiet. In short, then, what he described as the Haptic Interface is of equal importance to the technical solution in the melding of machine and soldier together.

(D) Cognitive Overload

At the conference something of an argument broke out between two members of the audience for Mr. Brower's talk, one a battle-worn soldier in uniform, the other a
hawkish looking military strategist in a suit. The argument was about the preparation of the individual to be a part of a Land Warrior System. What the soldier was pointing out was the danger of what he described as 'cognitive overload' – too much information bombarding the soldier's consciousness in a combat situation, and the increase in physiological stress that such overload would induce. Crucially, he pointed out that there had been little research undertaken on personal (read: identity) problems when a human becomes part of a human/machine system. His opponent agreed that unique training requirements needed to be addressed, after all, how else does a human remain more than 50% of a human-machine system? The soldier reminded the strategist that if the IQ of the average soldier was 100 that meant that 50% of soldiers were at or below that level. His opponent retorted that kids growing up today using computers and video games are training already to become part of Land Warrior systems.

Again Virilio's comments on the long-term government support for the car industry, training the population at large how to drive, came to mind. Indeed Western governments are today falling over themselves to train the populace in the use of the Internet, and the games industry has embraced such technology voraciously. The kids of today are indeed in training to become part of Land Warrior systems. Indeed one might say that the Citizen as a System is a reality that is almost upon us - our mobile phones, ergonomic footwear and automobiles already a good percentage of our human-machine systemic identities.

John Harrison spoke to the assembly about his experiences in Saigon. It must be said that of all that morning's speakers he made the most sense. Quite against the science-fiction/R&D fervour of the rest of the speakers, Harrison told us about the real work of the soldier. Historically, he stressed, frontline troops take the 'stuff' off. So much for the Land Warrior system. With almost brutal realism, (recalling the earlier soldier's comments about cognitive overload,) he also told us, "the more info you give [a soldier] about the guy he is about to kill the less likely he is to do it." Here was a real warrior telling us what it was really like to be in a situation where state-sanctioned
murder is your job. The picture he drew for us was visceral, physical, brutal, human. It was a picture of sweat, muscle, determination and blood. The only contribution of any real importance that technology can make to this primal scene is the weapon in your hand. The rest is superfluous and likely to be dumped in a bush to be collected later, after the fighting is over.
(E) Civilian Ectobionics

But the implications of what was being discussed at this conference seemed very strikingly pertinent to society at large. Ectobionics, once this military development has taken place, seem destined, with telling inevitability, to spread into industry, for deep sea oil exploration, chemical engineering plants, polar mining etc, and soon afterwards into the games and entertainment industries, where Starship Troopers suddenly becomes a game for all the family.

A suit that can run at seventy miles per hour and leap to the top of high buildings? It is not beyond the realms of possibility, indeed quite likely, that within a decade or two BMW or some other major manufacturer will bring one out onto the domestic market. This, however, begs the question: how soon before the integrity of the individuated Self becomes completely lost in the larger systems into which we fit it?

(F) Metabolic Cost

One of the interesting slants taken at the conference was the concept of Metabolic Cost. Peter Paicopolis of SOCOM, speaking on “Special Operations Needs and Requirements,” cited this first, but others later took it up. Whilst ostensibly referring to the ways in which the metabolism of the soldier is affected by the terrain in which he is working, and the ‘stuff’ that he is wearing and carrying, what it entails, in essence, is the search for ways of isolating the individual from the Actual environment s/he is in, and encasing them in an Ideal/Virtual environment for optimal performance - optimal performance, that is, on a scale which disregards visceral engagement with the Actual environment, as irrelevant. There was even talk of “unmanned” exoskeletons controlled at a distance by a soldier with an “I-Port”, as a mid-term goal, with fully manned exoskeletons as the longer-term goal. Very much in line with Professor Norman’s telepresent paraplegics.
Special Operations Forces (SOF) carry 170lbs of kit. About roughly the same as a Roman foot soldier. SOF are most interested in an exoskeleton system that carries that weight for them. There was a bit of an open discussion around this, on the subject of whether an exoskeleton system would be modular, adapting according to context, or whether it would concentrate on human augmentation, regardless of context. Kearns piped up asserting that it should "Enhance the human, don't give him another thing to operate." Dr. Garcia intervened to remind everyone that for the soldier weight and load are synonymous, but that an exoskeleton would separate the two. The system might weigh a great deal, but the load on the soldier might be zero.

The exoskeleton becomes almost womb-like in this respect – a parental protector and shoulder upon which to lean, a buddy that carries your load for you, a mother who feeds and defends you, a brother who fights by your side. Metabolic cost is reduced to minimum because you have your mechanical-computerised family with you – around you – on you. This artefact has Performative power in the network of soldier and machine that quite literally takes over from the individual's extended family. Further, it becomes almost symbiotic, machine and human dependent on each other for existence and the pursuit and achievement of goals.

Bringing up the issue of the breaching of the boundary of the skin once again, Dr. Vickers told us that in war games it had been found that Bio-Enhancement was generally frowned upon. Metabolic Cost includes any irreversible change. You can leave your exoskeleton behind at the base when you go off duty. Bio-enhanced troops getting drunk and smashing up the bar off-duty didn't appeal. Even the game players were reticent about bio-enhanced troops. So genetically enhanced troops, or troops with biomechanical implants or limb replacements like the 'Bionic Man,' seemed less likely a future reality than Starship Troopers. The winners of the games used SOF infantry in exoskeletons with unmanned robotic support.
These War Games were an imaginary war with what was described as a large peer competitor (read: China.) Dr. Vickers' 15 yr old daughter, after reading Heinlein's 'Starship Trooper', aged 10, is now adamant that she wants to be an exoskeleton regiment commander when she gets older. "Look out large peer competitor."

In the "Human Science Modelling" talk from Dr. Louis Piscitelle of the Natick Soldier Center, the problem of metabolic cost was laid out in cold terms like metabolic/muscular-skeletal stress, and joint angles. This scientific community, at the conference, in their discussion of the weight and load problems of the land warrior system, are looking at warriors as organic machines that balance and accommodate loads. Warriors are treated as intelligent, decision-making machines. It is only the few truly experienced soldiers here who keep bringing up the Human factor, and sound like Luddites in this company.

It is left to Mr. George Solhan, ONR, (Retired LTC, Marine Corps), to, like John Harrison, tell the conference about the grim realities of the soldier's job. In his talk he stressed the importance of camaraderie. "Men fight for their buddy, not for national goals," he tells us. "Intimacy with the terrain" (...)"is very important to being a warrior." An exoskeleton must not diminish this.
(G) Nightmare Visions

How far off into the future, then, if across this singularity in the machinic phylum we do indeed move into a world where the human is but a part of an integrated human-machine system – the Citizen as a System – and we all wear our exoskeletons instead of clothes, our fashions like mobile-phone covers, the disabled among us no longer at a disadvantage, our sportsmen genetically enhanced and our racing drivers testing the latest EHPA models... how far off into the future comes that nightmare vision of the 1960s sci-fi classic from the BBC – Dr. Who and the Age of the Daleks? For surely this is what they were – sentient, organic creatures living inside mechanical, non-organic exoskeletons, the two co-existing as a single system. Is this where the machinic phylum must inevitably take us, in its quest for efficiency and standardisation? Perhaps, on the evidence of the EHPA conference and its continued cherishing of the sanctity of the boundary of the skin, the age of the Daleks is more likely than the nightmare vision of that other 1960s sci-fi classic, Star Trek, and its 1990s creation, The Borg. My guess, however, continuing the sci-fi theme, is that rather than wasted, flimsy, midget bundles of flesh hidden away inside rather cumbersome wheeled vehicles, such as were the original Daleks, we will be bloated, obese creatures after the fashion of the Baron Harkkonen, from "Dune", strapped into sleek, hyper-efficient exoskeletons that make us all look and feel like Flash Gordon.

iv. Cyborgology

The lineage of the cyborg is something much discussed amongst cyborgologists both artistic and academic. We have looked now at Cyborgs in Fiction and in Fact, from the mythic Golem to the US plans for a SOF Exoskeleton. But what of Haraway’s assertion that the whole cyborg trajectory is fundamentally phallic, and originated in the days of the primitive hunter, not long down from the trees?
I) Stelarc's Obsolete Bodies

The extra-terrestrial environment of Flash Gordon, is where Stelarc's 'post-evolutionary' body surely finds its home. Stelarc offers us a number of options for the redesign of the body that can attain "planetary escape velocity." But the thrust of Stelarc's argument falls down. The 'kitchen pot' not only does not stop being itself as the performance asks us to imagine it as part of a man-machine system, it uses an imaginary that is as rooted in the human experience of the natural world as Clynes' and Kline's spaceman is divorced from it.

Stelarc: ...one can well argue that ever since we were hominids and developed bipedal locomotion, two limbs become manipulators, we begin to construct tools and instruments - machines - in other words the body has always been a prosthetic body, in a way we have always been cyborgs, in a way we have always been zombies, because I don't think we ever did have a mind of our own, as our western philosophy tended to want to affirm. On the one hand we fear the involuntary or the mindless, on the other hand we fear the automatic, or the cyborg, but the human body, one can well argue, has always been a zombie, will always be a cyborg, so from that point of view one can also argue that ever since we evolved as hominids technology has constructed our humanity. It's not an alien other that appears at the end of the millennia, it's something that has always been part of the human trajectory, it always defined what it means to be a body, what it means to be human. In that way, technology now, with the body, constructs strategies that quicken the possibility of change and allow a more complex intervention in the development of the body.

Now, the long slow progress of tool use from early hominid to mediaeval man marks us out as an animal surrounded by orthotic (but NOT prosthetic) extensions (and NOT replacements) of our limbs, opening up the possibility that we might interpret human history as a cyborg history. The more recent advance of science and technology - the products of a social privileging of intellection - have indeed brought huge benefits to those members of humanity which the attendant economic system favours, as well as greatly worsening the lot of those it does not. But the distinction between the terms 'orthotic' and 'prosthetic' when discussing tool use is critical, because it is precisely the
shift from orthotic to prosthetic which the advancing scientific project seems bent upon imposing into/onto our bodies in the 21st century, and to which this author is objecting, on the grounds that before such a project is undertaken we must be quite clear about what it is that we might lose. If our intellectual capabilities have not yet understood the nature of consciousness and our intuitive faculties remain sidelined as an unfathomable and irrelevant mystery - a fair summary of the status quo - then it is surely folly to risk a strategy that may debar our access to these faculties in the long run? Genetic engineering in the US has already contaminated the prime world maize stock in Mexico (Vidal 2001; Caistor 2002). There is, in effect, no longer any 'real' maize; only GM Maize.

Managing change is indeed what this author is concerned that we do with the utmost sensitivity, lest we allow the 'arbitrary' boundary between ourselves and our tools to stray so close that the distinction ceases to exist. Conceiving what it is to be 'human' as including the tools and things that we use, as orthotic extensions of ourselves, is to place us within heterogeneous actor-networks, and does not of itself exclude the possibility of dehumanisation. Though in such networks it may not be the case that in the end human preferences will dominate over material preferences, nor vice versa, that is only so long as human preferences remain distinct from material preferences. If that distinction breaks down, then we are lost, mere cogs in a machine of our own making, overwhelmed and overrun by a toolbox grown too big for its boots, no longer players in defining the situation to be performed, but props being played by other props - a pianola playing to a hall full of empty chairs.

II) Gray's cyborgs

There does seem to be some consensus amongst cyborgologists that the 'post-human' or cyborg phenomenon really is something qualitatively different from the already ancient tradition of human tool-use, and that it represents a new departure in human evolution - perhaps something post-evolutionary, in fact. As Gray asks: "But haven't
people always been cyborgs? At least back to the bicycle, eyeglasses, and stone hammers?" (Gray, Figueroa-Sarriera et al. 1995:6) This is something the early cyborgologists like Manfred E. Clynes and Nathan S. Kline may have suggested. These two scientists, as we have mentioned before, first coined the term 'Cyborg,' to refer to an enhanced man who could survive in extra-terrestrial environments. They thought of cyborgs as "self-regulating man-machine systems," (Kline 1960:xv).

Gray, rightly asserts that we have not 'always been cyborgs.' "Certainly we can look back from the present at some human-tool and human-machine relationships and say, "Yes, that looks very cyborgian," but this is only possible because of hindsight. Just as ancient humans, once they'd learned to wield the club, could see the tree limb as a tool. Before then it was only a branch. Cyborgian elements of previous human-tool and human-machine relationships are only visible from our current point of view. In quantity, and quality, the relationship is new. Yes, it is a direct development out of the human-tool and human-machine relationships, but it represents a fundamentally new stage, perhaps even culmination, of this history."

Today's cyborgs are, in fact numerous, and 'everyday.' As Gray reminds us, "There are many cyborgs among us in society. Anyone with an artificial organ, limb, or supplement (like a pacemaker), anyone reprogrammed to resist disease (immunised) or drugged to think/behave/feel better (psychopharmacology) is technically a cyborg." (Gray 1995:2)

Gray provides us with an exhaustive taxonomy of cyborgs: from the Restorative and Normalising - replacing lost limbs and organs and returning people to normality, to the Reconfiguring and Enhancing, creating post-human creatures with more than human capabilities (Gray 1995:3). He considers the Degrading, too, scene of will-less soldier/subjects like the Borg, and a whole host of others too numerous to mention. However, much of what has been discussed around the figure of the cyborg appears to be largely unsupported by any fieldwork, being principally theorising around fiction and
imagined potential futures. No-one seems to have actually spoken to anyone with an artificial limb, or to the scientists who make such things, or to the militarists who wish to procure them. This thesis is an attempt to redress that balance.

III) Summary

In summary then, much of what Cyborgology has to offer seems altogether entranced by its subject, and convinced that it is a new and exciting phenomenon. This is as maybe, but there is an immense backdrop to the production of the cyborg which makes it at the very least a child of the Enlightenment project, a child, as Haraway says, of the patriarchal military-academic-industrial complex spawned by modern science, if not, as she further infers, of the ancient hunter. In the third section of this chapter on Cultural Performance, then, having ascertained that narratives and stories lie at the heart of social phenomena, and traced the expressions of cultural lag through history, we must now turn our attention to the main plot: the cultural metanarrative of the Enlightenment Project itself. What is this primary performance all about? Who are its citizens? How did it form and what has been its path? What, in short, has been the epistemic backdrop to the cyborgs of cultural lag?
c. The Epistemic Backdrop

There are two principle threads to the story, which we shall take separately. Firstly, there is Capitalism itself, the economic-cultural engine of Modernity. Secondly, there is Panopticisation, the closely related disciplination of humanity into better and better citizens of a capitalist world. We shall take them in turn.

i. Performing Capitalism: A Matter of Perspective

The mind/body split, cousin of the Object/Subject division with which Objective Reality is represented to the Humanist Subject, with its isolated, Calvinist conception of God, is what broke the holistic catholic chain of being in the pursuit of arms-length profit, back in the days of Boyle and the merchant fathers. It is here, at the very roots of the Modern, that we must return our attention, if we are to understand quite what we are dealing with in these post-modern, post-human times, governed still by the impact of the prevailing narrative of the Enlightenment project, for all its fragmentation into Virilio’s micro narratives. Here we will find the starting point of what has been described as the process of abstraction, the distancing process which took humanity away from unity, spatialised it, intellectualised it, and carved it up into false oppositions.

It begins, perhaps, when the Persians raised the old Parthenon to the ground, and Pericles proposed and built a new Parthenon – the one we know of today, to replace it. From the point at the top of the steps up onto the Acropolis the eye of the beholder is drawn, and the Parthenon is deliberately inclined to present itself to that eye. Hardly a straight line exists in the entire building, so thoroughly is it designed to lean into that perfect view that the beholder at the top of the steps would see. Perfection attained through deliberate imperfection. It was a short-lived last-minute flowering of the Athenian world, however, and though the geometry and mathematics had been worked out, its further application would have to wait for another thousand or more years. It
returned, finally, in the monastic revolution of the 12th century, with the cellular structure of the monastery, and with the subsequent advent of clocks.

By the end of the thirteenth century clocks begin to appear in Cathedrals around Europe, though no-one knows exactly when or where the first one was. The sudden ubiquity of clocks breaks down time in Europe into hours, minutes and seconds, whereas before life had been lived from dawn through noon to sunset, according to the season. This spatialisation of time, arguably, prompted or fed into the reconception of space: the invention, in the 15th century, of perspective. These two developments were arguably the intellectual precursors of Boyle's new science, a century later. Briefly, Brunelleschi is credited with creating, in the early fifteenth century, the first painting in 'true perspective.' What he did, in effect, was reduce reality to a single point, and draw straight lines away from it - making it into a 'vanishing point.' Onto the resulting grid reality was made to fit, with the effect that the human eye was deceived by a powerful illusion suggesting 'depth' in the two-dimensional pictorial representation. This was perhaps one of the single most powerful 'technological enframements' of the modern era. It is certainly hard to believe that before the 1420s it didn't exist.

It is arguable, however, that for all the architectural benefits it may have reaped for medieval Florence, Brunelleschi's innovation actually robbed pictorial art of its 'true' depth - its symbolic representation - in favour of a flat and largely meaningless world of points and lines and visual trickery. (The Trompe l'Oiel of the Baroque was one of the favourite tricks of those dedicated to the Spectacle of supremacist power.) One only has to look at pre-fifteenth century pictorial art, as far back as the cave paintings at Lasceaux, to see that figures and objects with symbolic meaning were placed in the foreground, (with a few landscape features in the background, maybe, if the artist saw fit,) and that true depth in these paintings was achieved through the relationships between symbols, resonant with human experience and meaning. Contemporary cybernetic information theory, needless to say, like perspective, cuts out the messy
'subjective' humanity and meaning from the objects it describes, and the world which it creates: cybernetics is a three-dimensional 'perspective'.

So, as psychologist R.L. Gregory asks, "Is perspective a discovery, or an invention of the renaissance artists." Talbott answers: "Non-Westernised peoples frequently do not read perspectival images (including photographs) the way we do." (Talbott 1995:200) He also cites examples of formerly blind individuals and those with renewed sight having great difficulty seeing in perspective, and reminds us that Euclid had produced his geometry and optics some 1700 years before Brunelleschi - how else did Pericles build the Parthenon? - and that Arabic culture had continued to pursue these topics in a sophisticated manner during the interim. Mountains, as Talbott asserts, are experienced by the eye as much greater than the paltry versions 'perfect' perspective gives us in our photographs. "Through the effect known as 'size constancy scaling' we pick up on various cues about the distance of an object, and then compensate for great distance by seeing the object larger than geometry and optics would seem to allow." (Talbott 1995:200) Perspective in art, in short, was a choice, at a particular cultural and historical moment. It has more to do with cultural alignment than the revelation of the truth. It is a way of seeing, the geometry of which had been around for two millennia by the time the Enlightenment came upon the scene.

The points and lines of perspective, of course, have their correlates in philosophy. The Individual Subject is an abstraction from the symbolic world, a monad around whom the rest of reality - including his body - was increasingly to become regimented into the straight lines emanating from his 'vanishing point' selfhood. It is no coincidence that the very same Individual Subject, as Weber noted, was also the capitalist who drove the engine of the industrial revolution, rationalising working practice into the regimented grid of the factory floor, timed by the spatial co-ordinates of the clock, and then modelling society upon the same layout. It is this cultural performance to which we must now turn.
As we saw in our guide to the historical backdrop in the first chapter, it was the Puritans who created the Modern world. As Weber wrote, in 'The Protestant Ethic and the Spirit of Capitalism,' (Weber 1992), modern industrial capitalist society was the historical product of the instrumental reason which arose with Descartes, and this instrumental rationality "had its cultural and psychological origins in the Protestant asceticism of the early Calvinistic sects which developed a specific calling in the world, a calling which involved discipline, self-restraint and world mastery." (Buci-Glucksmann 1994:12) In stark contrast to the enveloping totality of the 'mother' church of the catholic tradition, the Calvinist believer was alone with God, with no church or magic rituals to support him. No great chain of being emanated from him to the furthest reaches of Creation, carrying the divine spark from the highest to the lowest rung and back unto God. There was a total uncertainty of salvation for the Calvinist believer. Over time, the quest for salvation became gradually redirected in practice and in theory towards "the more comforting view that those who were successful on earth (in business or the professions) could take this as a sign of their celestial security in the next world." (Buci-Glucksmann 1994:18)

The new Protestant creeds were thus very closely associated with the burgeoning middle-classes, allies in the revolution against their Catholic-Aristocratic masters in the absolutist monarchies of the day. In Britain, the Parliamentary curbs on the Catholic-leaning, absolutist royal power of the Stuart kings went hand in hand with liberalist lifting of curbs upon free markets. Not only did the axis of trade shift from the North-South routes between Holland and Italy, to the West-East routes between Britain/Holland and central and eastern Germany, but Britain became virtually the only European nation in which the King and his ministers had to ask for the money to go to war. Parliament had control of the purse-strings, and the tax burden on the people was soon twice that of other Europeans as the increasingly martial eighteenth century unfolded. But the parliamentarians controlling that money, and in the bitter rivalries between the Tories and the Whigs, liberally distributing it in favours and bribes to oil the wheels of power,
were, inevitably, very interested indeed in ensuring that the laws governing commerce became increasingly liberalised as time went by. By the end of the 18th century, with the encouragement and championing of Jeremy Bentham, even that ancient crime of usury was finally repealed, and the birth of the modern bank was at hand. As Bentham wrote in his “Defence of Usury” in 1787, “no man of ripe years and of sound mind, acting freely, and with his eyes open, ought to be hindered, with a view to his advantage, from making such bargain, in the way of obtaining money, as he thinks fit: nor, (what is a necessary consequence) any body hindered from supplying him, upon any terms he thinks proper to accede to.” (Bentham 1787) The money-lenders were allowed back into the temple – the temple refigured as the bank, the new great architectural centrepiece of London, set to rival St Paul’s, and the new home of a new performance practice and its new priesthood: financiers.

The bourgeois gentleman, victorious revolutionary, was the standard-bearer of commerce. This bourgeoisie, the new urban merchant culture which had emerged from the midst of the feudal society of the middle ages, were the masters of commodity exchange. This practice required individuals "to act and speak in new ways, ways drastically different from the aristocratic code of honour with its face-to-face encounters based on trust for one's word and its hierarchical bonds of interdependency." (Poster 1995) A whole new performed role was required, carved out, experimented with, established – the role of shopkeeper. But interacting with total strangers sometimes at great distances, the merchants required written documents guaranteeing spoken promises – the things that substantiated the new role, the props of the performance - and an 'arms length' attitude even when face to face with each other, giving them 'space' for calculations of self-interest. Abstraction from each other was the order of the day. "A new identity was constructed, gradually and in a most circuitous path to be sure, among the merchants, in which a coherent, stable sense of individuality was grounded in independent, cognitive abilities." (Poster 1995) Commerce was born, and with it, the Individual Subject, separated from the rest of the world, calculating his self-interest.
Weber’s Calvinist, concentrating on discipline, self-restraint, and world mastery, in his lonely quest for salvation from a God he is entirely alone with, in his heart of hearts, (Weber 1992), citizen of Hobbes’ Leviathan (albeit the Williamite “Chairman” version thereof), is a member of a paradoxically secular society devoid of any divine origin - no recourse to God for the sovereign or his citizens – founded on a scientific philosophy devoted to a Nature equally devoid of any divine presence. The citizen of such a society must, equally, look to a newly secular way of being. A new kind of Identity was carved out, under the aegis of the new constitution, an Identity closely associated with the modern condition - the Individual Subject.

He is, moreover, Boyle’s "credible, trustworthy well-to-do witness" and it is this well-to-do merchant-gentleman’s philosophy of capitalism that is installed as the programme in the artefacts that science and technology produce. Science, indeed, is refugured at this time as the handmaiden of technology, devoted to that same programme that must deliver ever more efficient and diverse means of generating capital. Science, in this reading, becomes nothing less than the intellectual currency of mercantilism, the glue that holds the practices of the new society together, and the secular unity of the Citizen becomes the State-in-miniature of the Individual Subject, sovereign master of his own body and his own house, the Modern capitalist. Together, science and the citizen will spend the next three hundred years tearing asunder all the old pre-modern certainties, declaring them muddled mixtures of natural and social phenomena. The moderns were suddenly free to "give up following the ridiculous constraints of their past which required them to take into account the delicate web of relations between things and people." (Latour 1993:39)

Then, around the turn of the nineteenth century, the modern commercial system almost completely in place, a crucial epistemic shift occurred in which Man as we know him today finally appeared. Shelley is writing the story of Victor Frankenstein and his Creature, Abernethy and Laurence are arguing in the Royal College of Surgeons over the nature of Life. The Mechanist-Vitalist debate is at its height. Boyle and Hobbes’ "new
constitution', brought into reality by the Glorious Revolution of 1688, has proceeded through the eighteenth century to spread into every corner of British life. This 'Classical' period has seen a great upsurge in interest in the ancient scientific endeavours of the Greeks and Romans – perspective is everywhere, and a rush to classify and label and spread out in tables all the wonders of the Natural world has captivated the imagination and daring of whole generations of colonialist explorers, the plunder of whose journeys around the planet still fills our museums to this day.

But the clarity of this Classical table of beings – epitomized by the Periodic table – the clean lines and clearly delineated cells into which knowledge is being shaped, have omitted the being for whom the table existed. Although man was represented in the table, man who reads and understands the table was not. Here at the threshold of the nineteenth century this crucial new tenet of the Modern world was fast becoming apparent. "Once the order of the world was no longer God-given and representable in a table, then the continuous relation which had placed man with the other beings of the world" – the very last remnant of the pre-Classical, pre-Revolutionary Catholic Chain of Being – "was broken. Man, who was once himself a being among others, now is a subject among objects." Worse still, not only is he seeking now to understand the table of objects, but also himself. "Man becomes the subject and the object of his own understanding." (Dreyfuss 1983:28) He is both performer and audience, and the performer is watching the spectator.

The first thing he understands, in this new relation to the world, is his own limitations. Language no longer represents the world to him so that he may know it. Language finally loses the very last of its mediaeval weight and floats free of reality altogether, becoming no longer the clear medium for knowledge, but a dense and tangled mess of signs with its own history. Man is finite, limited to the fundamentals of labour, life, and language, bounded by the mundanities of his existence, "a vehicle for words which exist before him." (Foucault 1997:313)
But limitation is immediately seized upon as the basis of knowledge. In this new world factual limitations are regarded as finitude, and finitude makes possible all facts. The limits of knowledge make possible the possibility of knowing. "Man emerges not merely as both subject and object of knowledge, but even more paradoxically, as organiser of the spectacle in which he appears." (Dreyfuss 1983:29) Not just performer and spectator, Man becomes the Director of the action, too. Total knowledge is won by virtue of the limitations which man has imposed upon himself. A strange paradox, but one which Modernity seemed to enjoy.

As evident most clearly in that prime early philosopher of the modern, Immanuel Kant, "Modernity begins with the incredible and ultimately unworkable idea of a being who is sovereign precisely by virtue of being enslaved, a being whose very finitude allows him to take the place of God." (Dreyfuss 1983:30) As Foucault identifies, this represents a philosophical state in which "finitude is conceived in an interminable cross-reference with itself." (Foucault 1997:318) This, nonetheless, is the basis upon which Modernity is built: "Man is an invention of modern thought." (Dreyfuss 1983:30)

This Man, moreover, is delineated, specified, defined by the limitations imposed upon him: he is citizen of the Leviathan, subject to which objective reality is revealed, manipulated, transported, bought and sold in pursuit of the build up of capital with which he may plead to himself, in his quietest thoughts, for an uncertain salvation; he is object, too, labour to be bought and sold within the complex game of accumulation, substance of the reality revealed to him, as subject, ripe for manipulation. Having soon exhausted the military-industrial colonisation of the planet, over the course of the nineteenth century, the process of endocolonisation of our own societies that soon gets underway in the twentieth must inevitably culminate, in the twenty-first, in the endocolonisation of our own bodies. But of course the process of abstraction and distance from the body, begun with perspective, furthered by Boyle and Hobbes, and completed by the invention of Man, necessarily returns to the body as a stranger.
Capitalism, then, as Cultural Performance, from its inception in 16th century to the present day, rests at the very core of the problem that is the cyborg. The very relationship between people and things that is constellated in the socio-economic game governed by commerce turns out to be the primary driver of the progressive foregrounding of objects, the ongoing abstraction of life, and the burgeoning phenomenon of cyborgism. Our performances as the shopkeepers and financiers of the capitalist world are the very performances that abstract us as Individual Subjects alienated from the network of relations that truly unite us with nature and the objects in our societies. Our performances within the continuous shifting and exchange of objects between and among us that constitutes our society are leading us toward a direct physical integration with those objects. Our collective cultural performance of capitalism is what Baudrillard would describe as a fatal strategy.

**ii. Performing Panopticisation**

This cultural performance, moreover, has been moulding our bodies for nearly as long as it has been moulding our selves. Foucault’s specific studies, "The Birth of the Clinic", "Discipline and Punish", "Madness and Civilisation" and "The History of Sexuality" offer a framework for understanding this production of the modern human being, a production which took place according to a range of techniques deployed through schools, prisons, workshops, barracks and hospitals, over the last two-three hundred years. The picture which emerges is one of human bodies disciplined in their every movement, the new empirical science applied to society in such a way as to completely regulate the behaviour of our bodies.

The epistemic shift that enabled these developments was from sovereign to disciplinary power. In sovereign power, the body of the king symbolized authority and centralized power, and procedures were carried out on the bodies of the king’s subjects in the name of the king. This power, though it has not disappeared, (and indeed thrives in the presidential icons of modern western democracies as much as in the despots of the
developing world,) was joined during this epistemic shift by a more pervasive system of disciplinary power, which has grown and continues to chart new territories for its control. Disciplinary power, in an almost Hegelian twist, transforms the supreme body of the king into that of the nation, the populace: 'everybody.' Instead of being the king's subjects, we became objects in our own right. As objects, we gained individuality: we became human - States in miniature.

The techniques by which this was achieved are numerous, and we shall briefly summarise only a few. Specifically in the advent of the hospital, in that of the modern prison, and in the categorisation of human sexuality, the ways in which we became modern are made startlingly clear.

In the late eighteenth and early nineteenth centuries a profound shift occurred in medicine, from Bedside Medicine to Hospital Medicine (Armstrong 1994:18). The advent of the hospital reversed the traditional dominance of the upper class patient. The new hospitals found their patients amongst the poor, and invited socially respectable physicians to treat them (Armstrong 1994:18). Where previously the patient dictated and defined the nature of the illness, in the new hospitals the doctor redefined the nature of illness such that diagnosis became exclusive to his own medical interpretation (Armstrong 1994:19). The patient was treated as an object. Medicine had effectively moved "from client control to medical dominance," (Armstrong 1994:19) changing the nature of the doctor-patient relationship at the same time as adopting an entirely new approach to illness - the 'sick man' disappeared, and was replaced by the pathology: "disease was reduced to a skin-encapsulated lesion" (Armstrong 1994:19).

Diseases, as we understand them, then, were 'fabricated' in this way by medicine, and so too were the bodies which contained them. "The new knowledges of human anatomy and pathological medicine mark the techniques through which medicine could know bodies and at the same time construct them in its own image" (Armstrong 1994:21).
Now this is a picture we might interpret as the gradual but seemingly inexorable inclusion of whole classes of People - and eventually everyone of us - under the umbrella of Things to be mobilised by the new scientific philosophy of Boyle and his descendants. This is yet another example of the denied hybridisation in which the supposedly clearly demarcated Nature and Culture continued - and continue - to be intertwined. Politics and social organisation informed by scientific principles comes to mean just that - to treat people in the same way as the new scientists treated objects. But of course in a world where Nature and Culture are strictly divided, it is not the Person who is thus treated, not the Individual Subject, whose rights within the Leviathan are guaranteed. No, it is the Object which that Person 'inhabits' - the human body, which is to be studied and mobilised by the new science. The division between Mind and Body is by now sufficiently complete for such a double think to go quite unquestioned.

Foucault developed an understanding of the human body as a politically, socially, and culturally invested object and subject, in very great detail. For Foucault the body is "directly involved in a political field; power relations have an immediate hold upon it; they invest it, mark it, train it, torture it, force it to carry out tasks, to perform ceremonies, to emit signs." (Foucault 1977:25) Furthermore, "this political investment of the body is bound up, in accordance with complex reciprocal relations, with its economic use; it is largely as a force of production that the body is invested with relations of power and domination; but, on the other hand, its constitution as labour power is possible only if it is caught up in a system of subjection (in which need is also a political instrument meticulously prepared, calculated and used); the body becomes a useful force only if it is both a productive body and a subjected body." (Foucault 1977:25-26) In other words, the body is the locus of a controlling cultural performance that is driven by the engine of capitalism.

For the mobilisation of things as the durability and substance of the new capitalist society of secular citizens must include, also, their bodies. But the methods of subjection of their bodies are subtle and multifarious: "That is to say, there may be a
'knowledge' of the body that is not exactly the science of its functioning, and a mastery of its forces that is more than the ability to conquer them: this knowledge and this mastery constitute what might be called the political technology of the body." (Foucault 1977:26)

This political technology of the body is not something defined or conceived as a discipline in the sense that medicine, physics etc were, nor to be built up by the "credible, trustworthy, well-to-do witnesses." It exists in the non-space of hybridisation, where Nature and Culture continue to be intertwined. It cannot be acknowledged for what it is for it is by definition something which exists by dint of what is ignored. It "is diffuse, rarely formulated in continuous, systematic discourse; it is often made up of bits and pieces; it implements a disparate set of tools or methods. In spite of the coherence of its results, it is generally no more than a multiform instrumentation. Moreover it cannot be localised in a particular type of institution or state apparatus. For they have recourse to it; they use, select or impose certain of its methods. But, in its mechanisms and its effects, it is situated at quite a different level. What the apparatuses and institutions operate is, in a sense, a micro-physics of power, whose field of validity is situated in a sense between these great functionings and the bodies themselves with their materiality and their forces." (Burwick 1992)

The history of the process of creating the modern political technology of the body Foucault locates in the 18th and 19th centuries: "The classical age discovered the body as object and target of power." As he demonstrates, it is indeed, "easy enough to find signs of the attention then paid to the body - to the body that is manipulated, shaped, trained, which obeys, responds, becomes skilful and increases its forces." In so many walks of life, from the prison to the hospital, the barrack to the school, the organisation of bodies into boxes unfolds with increasing precision. The body is increasingly to become viewed as an instrument, a machine inhabited and operated by the Mind. "The great book of Man-the-Machine was written simultaneously on two registers: the anatomico-metaphysical register, of which Descartes wrote the first pages and which the
physicians and the philosophers continued, and the technico-political register, which was constituted by a whole set of regulations and by empirical and calculated methods relating to the army, the school and the hospital, for controlling or correcting the operations of the body." (Foucault 1977:136)

Methods of control over the body developed in unprecedented detail during the 18th century. The body becomes constrained in its movements in the most clever and unobvious way; "...subtle coercion holds upon it at the level of the mechanism itself - movements, gestures, attitudes, rapidity: an infinitesimal power over the active body..."

For Foucault, these methods are called "disciplines". Many disciplinary methods had long been in existence - in monasteries, armies, workshops. But in the course of the seventeenth and 18th centuries the disciplines became general formulas of domination.

The disciplines were not slavery - there was no "appropriation of bodies." Nor was discipline analogous to 'service' or vassalage, ascetism or other monastic 'disciplines'. This "historical moment" when what Foucault describes as "the disciplines" appeared, was tantamount to the invention of an "art of the human body" geared directly toward making it "more obedient as it becomes more useful". The human body begins to be subjected to "a machinery of power that explores it, breaks it down and rearranges it." (Foucault 1977:137) Crucially, the better we become as citizens of the modern State, the more subjected we become to its domination.

So how does this notion of the disciplines play itself out? What are its essential features? Foucault puts forward a notion of Distribution, and the relationship between the Body and the Space it occupies. This is fundamental, for, as Foucault puts it, "discipline proceeds from the distribution of individuals in space." There are four basic methods of distribution outlined by Foucault:

1. **Enclosure**: a specific place where the discipline occurs, e.g. the confinement of vagabonds; schools - where the monastic model was gradually imposed, including boarding; military barracks, to control looting and violence; new, large factories with
accommodation built in, like walled towns or fortresses. Enclosure, however, was "neither constant, nor indispensable, nor sufficient in disciplinary machinery." (Foucault 1977:143)

Partitioning: "a principle of elementary location"; "Each individual has his own place; and each place its individual.". This is an "old architectural and religious method: the monastic cell." - even if the compartments are "ideal, the disciplinary space is always, basically, cellular." (Foucault 1977:143)

Functional Sites: the architectural cellular space became further coded to be function-specific; hospitals in particular saw this development - military and naval ones first. This functionalising of individual spaces got even better in late 18th cent factories, linking the distribution of bodies, production machinery, and different activities into one coherent system.

Rank: - "the place one occupies in a classification"(Foucault 1977:145) which individualises bodies by giving them a location which is not linked to a fixed position, "but distributes them and circulates them in a network of relations."(Foucault 1977:146) Done best in education, with ranks by age, performance, behaviour; a child will occupy "sometimes one rank, sometimes another... The organisation of a serial space was one of the great technical mutations of elementary education." (Foucault 1977:147) This of course was quite distinct from the Jesuitical, Roman model of education that had existed up until this period, with two teams competing for superiority - a "both senatorial and military arrangement." (Foucault 1977:147)

Perhaps the finest and most enduring image from "Discipline and Punish" is that of the Panopticon - a round building with a central tower, each individual cell with a window to outside and visible from the central tower. This is the structure which Foucault finds most representative of the disciplinary technology of the body. Build such a structure, and "all that is needed, then, is to place a supervisor in a central tower and to shut up in each cell a madman, a patient, a condemned man, a worker, or a
schoolboy......In short, it reverses the principle of the dungeon; or rather of its three functions - to enclose, to deprive of light and to hide - it preserves only the first and eliminates the other two. Full lighting and the eye of a supervisor capture better than darkness, which ultimately protected. Visibility is a trap." In the Panopticon, each cell is visible axially, from the centre, but invisible laterally, from cell to cell. The occupant can see that he is visible, but never knows when or whether he is being observed. "Hence the major effect of the Panopticon: to induce in the inmate a state of conscious and permanent visibility that assures the automatic functioning of power." (Foucault 1977:200) It is the pervasive sense of being observed in this way that makes of the Individual Subject a state-in-miniature – and a self-policing one at that. It is this panopticisation of the Self that gives rise to the 1960s concept of the policeman in one's head. Modern day surveillance techniques, of course - the ubiquitous CCTV - are testimony to the panopticisation of our entire urban way of life.

In sum, the Foucauldian view of the modern State is shown to be closely linked to the Latourian Constitution as set out in "We Have Never Been Modern." Discursive formation at the level of the episteme is shown to share a theoretical kinship with the Boyle/Hobbes construction of a science and its context, and to unfold in a way not dissimilar from Kuhn's tale of scientific revolutions. Following from these comparisons, it becomes clear that the disciplination of bodies - the political technology of the body - is itself a hybridisation in the non-space of denial between a demarcated Nature and Culture: the treatment of bodies as Things to be mobilised in the modern capitalist industrialised State, granting durability and substance to the Leviathan of citizens, whose existence as Persons in the Mind/Body duality of Cartesian logic must of necessity view the Body as the machine in which a Person is housed.

Recalling the social scenography of the individual as the site of social construction, the locus of cultural performance, we might say that it is also that part of ourselves into which pre-modern Sovereign power has transferred and in which it acts upon us in increasing detail. It is, in short, in the social scenography of the individual
that disciplination occurs: the panopticisation of society begins by setting up the intellectual equivalent of CCTV in our 'front' rooms. It continues – to further the analogy – by setting up actual CCTV outside our front doors.

iii. Vitalism - a counter-metanarrative?

Cultural Performance is a notion by which we have tried, in this chapter, to trace the metanarratives, the overarching stories that govern our day-to-day performances, as actors in society. It is a notion that has led us to examine the relationship between people and things as a primary, core relationship in the most fundamental metanarrative of the last few centuries: Modernity. Through the notion of 'cultural lag' and in our examination of the nature of the prevailing metanarrative of capitalism and the progressive disciplination of Man, we have seen that all too often things are at the centre of social innovations that lead a sometimes quite small vanguard to be 'ahead' of large groups – even the majority – of people, and that our Bodies themselves are regarded as things to be manipulated – even, perhaps sooner than we think, discarded. At the very hinge of this relationship between people and things is the ontological argument about the nature of Life itself: the argument between the mechanists, on the one hand, and the vitalists, on the other. This is a crucial argument, and yet one which continually provides us with surprises. No mechanist, in short, is without at least some 'nod' to the vitalists' beliefs, and no vitalist shy of using the mechanists' ideas for their own use. All too often, in fact, the differing arguments seem artificially opposed. Is not the free-floating, pattern-oriented, trans-substantiating Information of the cyberneticists, after all, not at the very least a cousin of the old anima sensitiva of the Vitalists, the force that could not be found on the dissection table yet imbued the living body with life, the force which could travel independent of its material substrate?
I) Vitalism Theory

Victor Frankenstein's complaint that modern science lacked the grandeur of mediaeval alchemy highlights the contemporary debate in Shelley's intellectual milieu concerning Vitalism. A schism in the life sciences in Britain came into the open in 1814 between a new breed of strict materialists and those, more traditional natural philosophers, willing to share a vocabulary with the religious. John Abernethy (President of Royal College of Surgeons), in his, "'Theory of Life' - conceded that the modern catchwords 'organisation', 'function', 'matter' could not explain what was distinctively life-giving. Life, that which vitalized, had to be thought of as something independent" - "a 'superadded' element was needed, some 'subtle, mobile invisible substance', perhaps a superfine fluid 'analogous to electricity', which would appear as a correlative to or confirmation of the idea of an (immortal) Soul." (Shelley 1994:xviii-xix) William Laurence, pupil to Abernethy, then later appointed as a second Professor at the Royal College of Surgeons (1815) came out publicly against: "'the motion proper to living bodies, or in one word, life, has its origin in that of their parents'" - "'subtle matter is still matter, and if this fine stuff can possess vital properties, surely they may reside in a fabric which differs only in being a little coarser.'" (Shelley 1994:xli) The burning question for these men, and for the intellectual elites following their debate, was starkly, and simply, 'What constitutes Life?' As Laurence himself says in his 1817 polemical lecture, "'an immaterial and spiritual being could not have been discovered among the blood and filth of the dissecting room.'" (Shelley 1994:xli) Indeed, how could deductive methodology find that which makes the whole greater than the sum of its component parts?

Vitalism, as an attempt to answer this thorny question, has a long pedigree. Essentially, it is the concept of force – some inexplicable, mysterious, cosmic, force running through all things in the universe – that forms the essence of vitalistic philosophies, ancient and modern. It is derived from the logos of Heraclitus and the entelechy of Aristotle, and appears later as Paracelsus's Archeus; Stahl's anima sensitiva.
Blake's *energy* and G. B. Shaw's *life force*. Aristotle is to be considered a vitalist, from his works, "On the Soul" and, "On the Generation of Animals". Some mediaeval Vitalists held the belief that matter was divided into two classes, based on behaviour with respect to heat: organic and inorganic. Inorganic material could be melted but could always be recovered by removing the heat source. Organic compounds changed form upon heating and could not be recovered by removing the heat source. The proposed explanation for the difference between organic and inorganic compounds was the Vitalism Theory, which stated that inorganic materials did not contain the "vital force" of life. This theory lasted until the mid-nineteenth century, when it was overtaken by the new materialist sciences.

Adolph Kolbe (1818-1884), a German chemist, performed organic syntheses that finally ended the popularity of the Vitalism Theory (with Pierre Berthelot.) Among the organic compounds he synthesised from inorganic reactants was acetic acid. He discovered the 'Kolbe reaction' in 1859, which allowed the production of large quantities of salicylic acid, eventually leading to the cheap production of acetylsalicylic acid (aspirin). Kolbe vocally objected to the proposition that chemical properties of compounds resulted from the orientation of "quasi-metaphysical" atoms, terming such ideas "hallucinations" and "fanciful nonsense."

Following Kolbe's lead, modern Organic Chemistry has developed since the mid-nineteenth century into a separate branch of Chemistry that focuses upon the carbon containing compounds, and has produced millions of organic chemicals, "in vitro" i.e. outside of living tissue. There seems little room for Vitalist theories amongst the tenets of this science. Interestingly, Organic Chemistry as a field has recently been expanded to include compounds of Silicon, since Silicon is similar in behaviour to Carbon, being in the same group within the Periodic Table. Given that the main material that microchips have as their foundation is Silicon, it is an intriguingly cyborgian development that the main chemical element establishing living organisms should be merged in this way with the main element involved in the modern inanimate computer world: 'Organic' chemistry now includes both Carbon and Silicon-based compounds.
In light of Latour, Kolbe's work, (and the field of organic chemistry as a whole,) clearly aligns itself with the Modernist tradition founded in the rejection of the ancien regime of catholic unity in favour of the radical, revolutionary, new epistemology of laboratory experiments and individual self-determination - the modernist object/subject opposition. The modernist observer that reads the objects of organic chemistry as in no way different from those of inorganic chemistry is content to leave the question of his individual consciousness aside from - and outside of - the argument. Today, such consciousness is regarded, in scientific circles like those Prof Norman moves in, as no more than the product of chemical reactions within the brain. Amongst scientists pursuing artificial intelligence, however, Vitalism seems to be experiencing something of a resurgence. Screen-based 'creatures' are being ascribed 'Life' because they exhibit some variously defined vital spark...

Vitalism was a continual thread throughout the nineteenth century, though always in tandem with the new mechanism. No-one was exclusively vitalist or exclusively mechanist. Even the most apparently ardent vitalist rested some of his ideas on the mechanists, and, conversely, even the strictest mechanists had some element of vitalistic principle in their formulations. "Any comforting notion" moreover, "that religion was vitalistic while science was mechanistic proves to be in error, both in the earlier period (Restoration) and the later on (French Revolution)." (Burwick 1992:45) The arguments between Abernethy and Laurence, both Professors at the Royal College of Surgeons, are a case in point. But certainly by the middle of the nineteenth century the mechanists seemed to be gaining the upper hand.

Vitalism, however, remains a philosophically thorny question. Teleology, for example, appertains to the study of manifestations of design, function or purpose(s) in natural processes or occurrences, under the belief that such natural processes are not determined by mechanism but rather by their utility in an overall natural design. Dysteleology is the doctrine of purposelessness in nature. Teleology, then, is associated
with Vitalism. It explains apparently purposeful animal behaviour by saying that the action is performed because it will later be advantageous to the animal.

Modern science, on the other hand, has sought to explain apparently purposeful behaviour through the dysteleological theory of mechanism. This theory includes the notion that an organism contains a model of the actual world and a model of the desired world and acts so as to make the actual world conform to the desired. Teleological notions are commonly associated by modern biologists with the pre-Darwinian view that the biological realm provides evidence of conscious design by a supernatural creator. But even after most biologists have rejected such creationist viewpoints, the role of teleology in biology has not disappeared, in particular with regard to whether such terms as 'function' and 'design' are permissible in biological terminology. Are such terms in fact: (i) vitalistic (positing some special "life-force"); (ii) requiring backwards causation (because future outcomes explain present traits); (iii) incompatible with mechanistic explanation (because of 1 and 2); (iv) mentalistic (attributing the action of mind where there is none); or (v) empirically untestable (for all the above reasons). Nonetheless, biologists continue to make use of such teleological terms as 'function' and 'design' all the time.

II) Mechanism

Norbert Wiener's cybernetics must stand as a prime candidate for the principle mechanistic philosophy of the 20th century. In Wiener's world, organisms and machines are gathered together under one umbrella, to be "considered as two functionally equivalent states or stages of cybernetic organisation." (Tomas 1995:27) Now, the mechanists are right when they say that humans are not as special as we once deemed ourselves to be. Yet rather than, as I believe the scientific establishment in general does, bring the human down to the level of the mundane, material and animal world we used to dominate, when we believed we were special, we should realise - with Haraway - how special the material and animal world actually is, alongside us, how consciousness
pervades all of it, as well as residing in ourselves, how inextricably interlinked and co-
dependent the human, animal, mineral, aqueous and atmospheric worlds are in the
living, Gaian whole that is our cyborg planet.

Crucially, it is with a holistic grasp that we understand the living nature of our
earthly home, a holistic grasp gained from outside, looking in, and not from the more
'concrete' science of reductive dissection. Perhaps the best way to highlight this is
through analysis of the mechanist's approach to the whole question of disability. The
mechanistic position seems somehow still to retain, quite paradoxically, some hierarchy
between human and non-human, in its vivisectionist approach to research. As Prof
Norman explained in relation to the ongoing testing of the Utah array:

Prof. Norman: We've implanted one of our electrode arrays in the motor cortex of a
primate. The primate plays video games. The video game is a very simple video game. A
spot comes up on the screen, and he has to put the cursor over the spot and then one of eight
radial positions lights up and he has to move the joy stick and put the cursor over the spot
that's lit up. And if he can do that in a second he gets a reward. And the primate can do this
very well. And we've had our electrode arrays implanted in a primate for over 3 years playing
this game.

Looking at the firing pattern of the neurons in the motor cortex of the primate,
Norman and his researchers use those firing patterns to determine where the primate is
moving his hand. The electrode arrays send their signals to a neural network in a
computer. Neural networks can be trained, so each time the primate moves his arm to
the right, the firing pattern is examined and allocated an association: this means move to
the right. Each time the primate moves his arm up, Norman looks at the firing pattern,
and allocates to it: this means move up, and so on. Neural firing patterns, of course,
occur before the physical movement. The neural network is trained to recognise the
firing patterns, so that Norman can estimate where the primate is going to move. Thus
far, Norman and his team can estimate where the primate is going to move to within 80-
90% correct. It still can't do it 100% correct. This is with only 16 electrodes. How many electrodes would be required to reliably control a wheelchair for example, Norman believes is a crucial point. If this technology is going to miss interpreting which way a primate wants to move up to 20% of the time, and it's a wheelchair that the technology is controlling, 10% of the time the wheelchair user is "going to want to turn right and he's going to go faster straight ahead and smash into a car. Not a good idea.... So before these systems are implanted in human volunteers, you don't allow them to get into situations where significant damage could happen to them and to others."

This problem is quite crucial, if the Utah array is ever to fulfil its promise as an ameliorative technology for disabled people, and, for example, provide the blind with some sight. The story of Stevie Wonder is a case in point. Blind since birth, Stevie Wonder became involved in a media furore over a program being undertaken at John's Hopkins University in the late 1990s, involving retinal implants. The question of course, was whether someone blind since birth would ever be able to use retinal implants to 'see.' Those at John's Hopkins at least felt not. Similarly, the artificial vision system of Bildo Bell, from New York, formerly of the University of Utah, gained much media attention, and in Norman's view set the whole idea of artificial vision systems back many years. The essential problem with it was that it looked like something from the movie Universal Soldier – as Norman put it, a "garden hose plugged into this guy's brain - doesn't look good.... it's a Frankenstein sort of image." Norman is acutely aware then, of the social stigma potentially associated with some kinds of technology.

This amounts to three big challenges: it has to work – and if Prof Greenfield is right that first challenge may never be met; and it has to work for decades, and be aesthetically pleasing, too. Certainly Ju90 would agree with the last point. The mechanistic approach here, however, is based upon assumptions about the innate 'rightness' of 'correcting' what are seen as 'flaws' in the 'imperfect' bodies of disabled people. The paradoxically 'special' case of human over non-human proves actually to be
even more specific – it is ‘healthy human’ or – even – the perfect or ideal body of anatomo-physiological study that is ‘special’ and to which all of us must aspire.

The mechanist’s approach, then, with no recourse to an appreciation of life for its own sake - because ‘life’, in a cybernetic understanding of the word, is as attributable to a bunch of pixels moving around on a computer screen, or a robotic toy dog, as it is to animals or human beings – must necessarily hold up a picture of ‘perfection’ to which all else must aspire, if their dysteleological understanding of the world is to have any sense at all. Any machinic or organic cybernetic organism must, by this reckoning, contain a model of the actual world, and a model of the desired world, and act so as to make the actual world conform to the desired. Thus you have a picture of the perfect human body held up as the desired world, and a host of technological fixes designed to make the actual conform to the desired. [Leave aside the necessarily contingent and socially constructed nature of the desired world!] Diversity, on the other hand, as a doctrine, values all those organisms that do not conform to the mechanists’ desired perfect world, seeing rather from a holistic perspective their utility in an overall natural design that profits from the adaptability, flexibility, and specialised input of a profusion of variety. Diversity, in fact, as a doctrine, does not recognise the perfection of the ‘perfect body’ held up as the desired world by the mechanists. Such a body is but one among the many. This holistic-ecological pro-diversity approach is of course teleological – ascribing purpose to the overall natural design. Gaia’s planetary self-regulation requires diversity for ‘her’ stability. To this teleological approach, there is innate value in the individual, for example, whose eyes do not work as others’ do, and the technological fix that Prof Norman may one day make available is so laden with implicit, judgemental, ‘corrective’ connotations, as to directly devalue that individual. The technological fix, should it arise, must, at the very least, remain elective.

The cochlear implant for the deaf is a prime example of the potential problems of technological fixes. On Oct. 4, 2002 a Michigan Circuit Court judge ruled that a mother had a right to refuse elective cochlear implant surgery for her sons. In the court case,
there was quite an argument concerning the attempt of one State agency to force upon
the boys (temporarily in their custody) what is supposedly an elective surgical
procedure, the mother ranged on one side, happy with her own and her sons' deafness,
and an 'expert witness' on the other side stating that without cochlear implants a deaf
person's brain cannot develop. This is quite critical - and appalled many disability rights
activists. As one reporter noted:

"People identified as being unable to think correctly (or at all) are disabled by our society
almost unthinkingly, denied the chance to make decisions that those around them simply assume
are theirs. And the connections many people make between mastery of spoken language and
cognitive skills have been criticized by deaf and hard-of-hearing people for years.... If the boys'
present and future disadvantages were attributed to our hearing-dominated society rather than to their own deafness (and their deaf parents' acceptance of their deafness), teaching them pride in who they are and the skills to struggle would make more sense. Many people who do hold the
institutions of the hearing majority responsible (including some who regard cochlear implants as a
good thing in some cases) are vehemently opposed to [the position of the 'expert witness.'].... But because the people who brought the case forward blame these disadvantages on the boys' inability to hear rather than on society's insistence on hearing as a prerequisite to full membership, cochlear implants are seen by many people as a solution to disability. Denying the children implants looks like condemning them to a lesser life. (Montgomery 2002)

We may recall, here, the comments in the Disability Rights Commission's report
on Genetics: "Human diversity is a cause for celebration and it should not be eliminated
by discriminatory assessments of people's quality of life." (DRC 2001:21) It quotes from a Royal College of Physicians report published in 1991, praising its use of the language of Human Rights, but laments that, "There is always a danger that people will use the language of rights but in practice act differently". The report states, "A further benefit of a genetic service is to reduce the birth frequency of children with chronic mental and motor handicaps with obvious benefits to individual families and with financial savings for the community" (DRC 2001:17)
Naturally, Ju90 also had things to say on this issue – particularly that, in her words, "Science is self-propagating. I think it's interesting the amount of research that's now being done in terms of detecting the quote genetic abnormalities before birth and terminating pregnancies." This is a very 'eugenic' turn of events, and, as she says "a huge issue in the disability rights movement at the moment." But Ju goes much further on this issue, and makes some very radical claims:

Ju: What's interesting is that they've already moved from trying to find cures for everything to trying to kill people because the only way we can maintain the link: Science being able to do everything, is either to cure it and genuinely do everything, or kill the evidence. And I think one of the things that I find very interesting is that in a way it's not even a resources issue, because at the same point that children are being killed before birth purely around impairment, there's a whole new generation of disabled babies being created of kids who would have died had science not interfered. But that proves that science has got power over life. Whereas the birth of the other disabled kids, in the next cot has to be prevented because they're absolute proof that science doesn't have power over life. And so you have got scientists in the medical profession who are sort of first to try and keep these myths going.

This is very strong stuff, and in this author's mind perhaps goes a little too far. Nonetheless the issues around persons and objects and the power of the mechanistic paradigm over human life are thrown into stark relief by these ideas. Termination of pregnancy based upon the perceived impairment of the child-to-be is something that has been practised as State policy by several nations right into the recent past, (Sweden, for example, whose eugenic laws were only repealed in 1976 (Webster 2003)) but which nearly all contemporary commentators would decry.

Ju's opinion of the medical profession is very low. To her, the control which a mechanistic-scientific approach to human life gives to the practitioner of such a science is hubris. "I mean I actually see Harold Shipman as being in a way not different from any other doctor - he's just taking it to its natural extreme. That he can have the power over life and death, and play God. And I think all doctors do." Shipman, of course, as she
freely admits, used his own criteria to make judgements about quality of life, allocation of treatment, and whether or not to administer lethal doses of painkillers. But, unapologetically, she insists that it's actually a big issue in the disability movement "the number of elderly people who are basically killed, because they're in institutions and they're sedated and they're left without food or anything." Whether or not such death-by-starvation is "a very deliberate process" as Ju claims, it is nonetheless probably true that the judgements being made about elderly people in institutions, in terms of their quality of life, are "based on how they're reacting to an institution, not how they'd be if they were getting better care."

The contradictions between the efforts of some scientists to preserve life and the efforts of others to avoid disability are certainly relevant here, though perhaps the image of Shipman as a model for the Doctor playing God is somewhat over the top. Certainly Prof Norman would seem to align himself with those trying to avoid disability, with the Royal College of Physicians, and with the 'expert witness' called to testify at the Michigan trial.

So the issue is a thorny one. The 'desired world' model is very powerful in the modern psyche, and the actual world - with all the medical technology today available to keep people alive despite conditions so far from the 'middle' of our human diversity as to question where exactly one is supposed to draw the line - makes individual autonomy and choice the paramount concern. Where the line is drawn with regard to the cognitive ability to make such choices pushes the boundaries even further. This author suspects, however, that a diversity-led approach, as opposed to the 'corrective' approach, is better equipped to deal with such challenges in the interests of both the individual and the wider "overall natural design" of which the individual is a part.

On the subject of autonomy, however, Greenfield, interestingly, asserts that actually quite a lot is known about how the brain becomes individualised. "There is no special, single feature; rather, individualisation results from interaction between the
environment and mechanisms inside the brain, causing changes in the way neurons network together across the whole brain. It is this individualisation, which is retained even during sleep and is thus independent of consciousness - that I personally view as the mind. As we age and acquire ever more memories, our minds become increasingly personalised and individualised, and better able to understand our world. Perhaps this is what is meant by the wisdom of old age." (Greenfield 2000:91) The striking similarity between this understanding of individuality and that touched upon in the first chapter as suggested by Bergson, is of particular note here - the sense of the accumulation of the memory as we continually crest the expanding past, living the present moment as the totality of all that has gone before.

Fundamentally, Greenfield disputes the very basis of Norman's work. Scientists like Norman, and Prof Warwick in the UK, "envisage a computer interfacing directly with a human," - precisely what the Utah array is designed, one day, to achieve -"generating artificial senses and reading a persons thoughts. One way this might be achieved, they speculate, is to use microscopic probes that connect to synapses." This is what Prof. Norman's Utah array does, in fact, do. "But we know," says Greenfield, "that the brain just doesn't work like that..... consciousness involves millions of neurons forming transient assemblies; tinkering with individual synapses would have little effect." (Greenfield 2000:196)

So looked at from where Greenfield stands, Norman's work is predicated upon a very narrow and mechanistic approach to neuroscience, with no holistic grasp of what the brain is really all about. The whole problem of such a mechanistic approach, of the traditional scientific method, in a way, is that it is so reliant upon that which it does not even properly attempt to define - the consciousness that makes the observations from which scientific 'facts' are construed.
The divide between the scientific approach, and its corrective technological fixes, and the diversity-led approach, and its holistic, ecological relativism, remains essentially the same argument as that of their forebears: the mechanists and the vitalists of the previous century. Neither is exclusively confined to their own arguments, and there is common ground as well as profound disagreement. The continuity from nineteenth century vitalism to its modern, holistic-ecological / diversity-led cousin, requires two missing pieces: the neo-Vitalism of Bergson in the inter-war period, and Deleuze’s revisiting of Bergson at the hinge of the post-structuralist turn. Here, in due course, we will find that it is precisely consciousness, and the intellectual courage to properly address it, that sets the vitalistic counter-metanarrative apart from the scientific-materialist, mechanistic, cybernetic, metanarrative of the ongoing Enlightenment project.

Now, we cannot re-introduce Bergson here without also considering the broader neo-vitalist movement of his time, and the social context to which it contributed. Driesch’s vitalism, contemporary with Bergson’s, a kind of social Darwinism, proved to be the ultimate in the racist protestations of a nineteenth century vitalist tradition that placed white Europeans at the pinnacle of a vitalist evolution, and fed into the Aryan mythology of the Nazis. Bakhtin, writing in 1926, - the same year as Lang’s “Metropolis” - singled out Driesch in particular for condemnation, in his survey of “Contemporary Vitalism.” But – interestingly – in an evaluation that was to give to dialectical materialism the final say in all matters, Bakhtin “incidentally shows us the advantages of vitalism over mechanism. More importantly, he demonstrates that both are ideologically and politically charged, not the neutral discourses some scientists have imagined them to be.” (Burwick 1992:60) Criticism of Bergson during this period consigned his ideas to the past, as if he were a mediaeval alchemist. But Bergson had not, “in reality, resorted to anything remotely like a mysterious “fluid,” as had such early `substantival’ vitalists as Willis or Stahl.” To Burwick and Douglass, the damnation of Bergson suggests a disturbing possibility: “that his work is a repressed content of modern thought.” (Burwick 1992:7)
In his famous 1907 book, "Creative Evolution", (Bergson 1944) Bergson adds his voice to the general re-appraisal and resurgence of the Vitalist tradition at that time, outlining his concept of the *elan vital*, ("creative impulse" or "living energy"), which he argues lies at the heart of evolution, in place of the Darwinian concept of natural selection. It is a monist philosophy, a re-unification of the sundered worlds of Nature and Culture. Importantly, Bergson is explicit in stating that this *elan vital* is a force whose existence cannot be scientifically verified – a crucial break from the traditional ‘substantival’ vitalists who contended that there must be some fluid or other organic material at the spring of life. These earlier vitalists also believed that there must be some divine force outside of matter, driving it. The *elan vital*, however, is a property of matter itself, consistent with the reconception of the material inherent in the concept of the *durée réelle* – that is, that material objects do not exist separate from a ‘fourth dimension’ of time, in which events involving these objects occur, but that time and matter are indistinguishable, that the flow of unfolding evolution is the continuous movement of a space-time whole that is quite simply not divisible in the way that Boyle’s descendants persist in doing. Bergson even differed with Einstein on this crucial point, challenging the theory of relativity in ways only the later quantum physicists would dare.

In this book, Bergson laid out the proposition for which he is now famous: that "the universe is best understood on the model of the development and elaboration of consciousness." This is a non-substantival but no less teleological Vitalism, with consciousness at its core, and resting upon the foundation of a holistic grasp of an indivisible space-time whole. Moreover, "According to at least some historians of science, modern physics has discovered that Bergson was right." (Burwick 1992:4).

Now Bergson’s philosophy carries with it both great dangers and great responsibilities. If the intellect is indeed to be demoted from its rationalist pinnacle, if our intuitive faculties are truly the greater, then a gigantic doorway is opened. As Irwin Edman says in his fascinating introduction to Arthur Mitchell’s 1943 translation of *Creative Evolution* for the Random House Modern Library, ""The *elan vital* means a renaissance to
a poet; to a barbarian it means brute power." (Bergson 1944:xvi) In the world of intuition, as Levi-Strauss amply demonstrates on many occasions in his studies of world mythology, (Levi-Strauss 1992) at the threshold of every door there is a guardian – a gargoyle. It is my reading of the fall of Bergson’s philosophy from favour, and his consignment to a "repressed content of modern thought," that the Nazis were the demon at the gate, and that having defeated them and retreated from that gate back into the primacy of intellection, the Western World is loath, as yet, to risk that road again.

So how, from Bergson’s neo-Vitalism, do we arrive at today’s holistic-ecological diversity-led perspective as variously represented by Haraway, Greenfield, Hayles, Ju90 and the disability rights movement in general? What, after all, is all this talk of individual autonomy and human consciousness, after having so exhaustively deconstructed the Individual Subject in the last chapter? What room, moreover, for teleological, vitalistic thinking in critical theory, after the post-structuralist turn? Well, as Cuff, Sharrock and Francis neatly summarise, "Despite its denunciation of the Subject, post structuralism has such a strongly individualistic cast to it that it can reasonably be interpreted as expressing, or at least implying, not only an anarchistic moral and political theory which is rigorously and thoroughly anti-hierarchical, but even an extreme form of it" (Cuff, Sharrock et al. 1998:253-4). Post-structuralism, in short, seems on the face of it to retain some of the Humanist Subject it otherwise decentres, as some kind of ‘essence’ of individuality and autonomy – even if only in the Derridean sense of deconstructing everything from the aloof autonomy of a ‘position’ it is otherwise quiet about.

Moreover, in cultural performance terms, this individual autonomy is something the cyber-cowboys cling onto in their digitised, virtual environments. Theirs’ is a ‘position’ that transgresses many boundaries, across time and space, and across the organic/inorganic divide. But this boundary crossing is typical of the cyborg, and of the contemporary in general. Indeed, much of the work dedicated to discussing cyberpunk, and the cyborg in general, (this thesis included) relies upon the notion of text, as proposed in the course of the so-called 'linguistic turn' by Derrida. This notion purports
that, "there can be no principled grounds for drawing definitive boundaries between any of the disciplines concerned with language and its uses.... it is no longer possible to treat literary criticism, history, sociology or any other of the human studies as discrete domains on the basis that they deal with different phenomena, have different intellectual concerns and characteristically work with different forms of data." (Cuff, Sharrock et al. 1998:289)

So, in cyberpunk fiction, for example, the decentring process has, as we saw in Gibson's work, led to "decoupling the body and the subject," (Stone 1993) granting to the subject a proto-essentialism beyond the requirements of instantiation - the self as essence of a body it needn't even inhabit. As Moravec asserts in his handling of the subject:

"For Moravec, it is not acceptable to assume that personal identity is defined by the "stuff," as he calls it, of which the body is made. Opposed to this view of "body-identity", Moravec proposes the concept of "pattern-identity". and defines this concept as follows: "'Pattern-identity, conversely, defines the essence of a person, say myself, as the pattern and the process going on in my [head and body,] not the machinery supporting that process. If the process is preserved, I am preserved. The rest is mere jelly." The dualistic implications of this are clear. The mind is independent of the body." (Figueroa-Sarriera 1995:133)

As we shall see, such decoupling presents profound philosophical problems - let alone the neuro-scientific problems pointed out by Prof Greenfield. The contemporary cyborg turns out to be not so much a postmodern, subject-decentred figure, as a post-structuralist, subject-decoupled figure, retaining something of its humanist essence whilst allowing the body that once gave it a home to be re-figured.

This dissolution of boundaries in the linguistic turn is something which many cyborgologists have concentrated upon, no less, as uniquely epitomised by the cyborg figure. As Tomas points out "'transgressed boundaries, in fact, define the cyborg, making it the consummate postmodern concept' - or, from a reverse perspective,
'uncertainty is a central characteristic of postmodernism and the essence of the cyborg.' 
(Tomas 1995:37)

As Haraway puts it, "Late twentieth-century machines have made thoroughly ambiguous the difference between natural and artificial, mind and body, self-developing and externally designed, and many other distinctions that used to apply to organisms and machines. Our machines are disturbingly lively, and we ourselves frighteningly inert." 
(Haraway 1991:152) Boundary-transgression, moreover, is not confined to the blurring of organic and inorganic. "By the late twentieth century in United States scientific culture, the boundary between human and animal is thoroughly breached." She infers, no less, from this, that, "Movements for animal rights are not irrational denials of human uniqueness; they are a clear-sighted recognition of connection across the discredited breach of nature and culture. Biology and evolutionary theory over the last two centuries have simultaneously produced modern organisms as objects of knowledge and reduced the line between humans and animals to a faint trace." (Haraway 1991:151) In typically forthright fashion Haraway goes on to conclude, "Within this framework, teaching modern Christian creationism should be fought as a form of child abuse." (Haraway 1991:151)

Now we have already seen through the eyes of Prof Norman and the mechanistic, cybernetic approach, how the boundaries between animal and human, and between organic and inorganic, have become blurred. But Haraway goes further:

"The boundary between physical and non-physical is very imprecise for us.... Modern machinery is an irreverent upstart god, mocking the Father's ubiquity and spirituality...Our best machines are made of sunshine; they are all light and clean because they are nothing but signals, electromagnetic waves, a section of a spectrum, and these machines are eminently portable, mobile - a matter of immense human pain in Detroit or Singapore. People are nowhere near so fluid, being both material and opaque. Cyborgs are ether, quintessence." 
(Haraway 1991:153)
So Haraway can conclude, then, somewhat ominously, in a later article, that, "Cyborgs are about particular sorts of breached boundaries that confuse a specific historical people's stories about what counts as distinct categories crucial to that culture's natural-technical evolutionary narratives." (Haraway 1995:xvi)

It is precisely in the arena of evolutionary narratives, however, that the contemporary trend of boundary dissolution presents its most tantalising surprises. For at the root of the linguistic turn, at the foundation of post-structuralism, we find a textual study, a revisiting and contemporary critique and re-reading, by one of the first proponents of post-structuralism, Gilles Deleuze, of the early twentieth neo-Vitalist, Henri Bergson. This text, *La Bergsonisme*, published in France in 1966, and in English in New York in 1988, in the eyes of Paul Douglass, at least, presents us with the possibility that Vitalism, albeit in its early 20th century 'neo-' form as propounded by Bergson, can be considered a vital source for many of post-structuralism’s most pivotal ideas.

Clearly the post-structuralist turn in the latter half of the 20th century has many strands, and it would be wrong for this author to attempt here to simplify it or to suggest that even a majority of its authors were in anything like broad agreement. But, Gilles Deleuze is possibly one of the most potent and interesting voices in post-structuralism - Foucault said that the 20th century might perhaps one day come to be known as "Deleuzian." (Foucault 1995:165) *La Bergsonisme* is an analysis of the philosopher’s key concepts and an assessment of his philosophical accomplishment. "If we are willing to grant Deleuze even a fraction of the significance Foucault would give him – if, that is to say, Deleuze’s contribution to post-structuralism is constitutive – then we must confront the fact that post-structuralism offers us a sort of "Bergson redux."" (Douglass 1992:368)

In *La Bergsonisme*, as Douglass reads it, in his essay *Deleuze’s Bergson: Bergson Redux*, "Deleuze has taken up the cudgels for a time-worn cause: namely, the vitalist approach to philosophy." (Douglass 1992:370) Douglass contends that there is almost a "willed memory lapse" amongst those discussing post-structuralist thought, in this
regard. Anglo-American criticism at least, according to Douglass, seems to have "failed to appreciate post-structuralism as a resurgence of a time-honoured movement in Western social, psychological, and political theory – especially as a rejection of formal logic and dialectical reasoning." What he means here is what Deleuze describes as a "counter history" of philosophy: "an escape from the games of negation, a turning back against Platonic dialogue, and an embrace with a 'different' philosophical method exemplified in the works of Lucretius, and latterly, Nietzsche and Bergson." (Douglass 1992:370) Vitalism, in short, as a counter-metanarrative to the Enlightenment project.

Indeed, as we shall see, many of the issues of post-structuralist thinkers like Foucault and Butler, mirror the issues of Bergsonian vitalism: multiplicity, duration, and movement. For Douglass, "The post-structural vocabulary of 'decentring' is actually a sophistication of the [Bergsonian] concept of flux." (Douglass 1992:371) Deleuze is especially admiring, Douglass tells us, of Bergson's "'critique of the negative and of negation, in all its forms, as sources of false problems'. This constituted a frontal attack on traditional logic based on negation, as in Socratic dialogue. Bergson had stung the establishment with an unorthodox method that claimed to mediate between idealism and realism, subjectivism and objectivism, and even between physics and metaphysics." (Douglass 1992:372) This very refusal to engage with formal logic and dialectical reasoning formed the central thrust of Bergson's turn of the century work, Matter and Memory, - a pivotal text in Deleuze's Bergsonisme because it sidesteps the dualisms of dialectic, proposing something different:

"Matter, in our view, is an aggregate of "images." And by "image" we mean a certain existence which is more than what the idealist calls a representation, but less than that which the realist calls a thing, - an existence placed half-way between the "thing" and the "representation." This conception of matter is simply that of common sense.... For common sense, then, the object exists in itself, and on the other hand, the object is, in itself, pictorial, as we perceive it: image it is, but a self-existing image." (Douglass 1992:372-3)
From such statements Deleuze extrapolates, correctly, for Douglass, Bergson's "determination to escape the history of philosophy by short-circuiting dialectical oppositions." (Douglass 1992:373) In place of such oppositions, Bergson uses a terminology of "composite images," "multiplicities," or "aggregates," and the truly radical nature of Bergsonian analysis, as read by Deleuze, resides in this notion of multiplicities. "That discussion," moreover, Douglass notes, "inevitably focuses on tensions inherent in a constantly evolving cosmos that is not merely analogous with, but finally indistinguishable from, what we call "consciousness."" (Douglass 1992:371)

The web of relations between nature and culture and the multiple hybrids between them continue to proliferate in spite of the attempts of modernist intellection to demarcate them: the material and the mental, the object and the subject, are not so easily divisible as the habits of grammar would suggest, and the discursive formations which attempt to isolate them are reflexive and self-supporting. The unfolding cosmos and our consciousness of it are not distinguishable in an intuitive apprehension of reality unfolding in real/time.

Deleuze makes Bergson's philosophical method — intuition philosophique — "partly synonymous with what many.... have come to call "deconstruction,"" and lauds it as "one of the most fully developed methods of philosophy," portraying it as quite opposite from the "retreat into primitivism" described by Russell and Santayana. (Douglass 1992:373-4) Douglass elucidates how Deleuze sees Bergson's philosophy of intuition "enhances 'precision' in philosophy, which is fraught with our tendency to spatialize, 'to think in terms of more and less, that is, to see differences in degree where there are differences in kind.'" Deleuze, indeed, appears to embrace Bergson's views of intelligence, instinct, and intuition: "Bergson shows clearly that the intelligence is the faculty that states problems in general (the instinct is rather a faculty for finding solutions.) But only intuition decides between the true and the false in the problems that are stated, even if this means driving the intelligence to turn back against itself." Douglass describes this as an ingenious reading, but not one so ingenious as to reach the point of perversity. It
appears to remain true to Bergson’s own definition of intuition as a “laborious, and even painful, effort to remount the natural slope of the work of thought,” an effort in which “the mind has to do violence to itself, has to reverse the direction of the operation by which it habitually thinks, has perpetually to revise, or rather to recast, all its categories.” (Douglass 1992:373-4)

The philosophy of intuition does, in effect, form a method with its three central rules. “This is an essentially problematizing method (a critique of false problems and the invention of genuine ones), differentiating (carvings out and intersections), temporalizing (thinking in terms of duration). (Bergsonism 35) With these three principles of problematizing, differentiating, and temporalizing, Deleuze says, “we have found a methodological door through which we can escape from the prison-house of dialectical reasoning.” (Douglass 1992:374)

Non-being, disorder, the possible – all the traditional problems of speculative philosophy, Deleuze, with Bergson, rejects as illusory: such “pseudo-problems” arise out of the intellect’s tendency to spatialize and quantify. “The illusion is always the same in essence: confusion of time with space. Thus, philosophy becomes blind to the nature of ‘composite’ reality.” (Douglass 1992:375)

The three strands of the intuition philosophique as identified by Deleuze, are indeed extremely illuminating in our discussion:

“Intuition problematises in the sense that it questions intelligence and forces it to confront its own tendency toward artificial closure.” (Douglass 1992:374) But of course problematization is something one must naturally expect any philosophy to do.

“Intuition differentiates in a way that contrasts strikingly with traditional logic, making differences in kind more important than differences in degree, and thus enabling duration to take precedence over space.” Bergson is aware that “everything is mixed together,” and that experience “offers us nothing but composites.” – the hybrids between
falsely demarcated nature and culture. We tend naturally to “apprehend qualitative differences as though they were quantifiable, and the result is unending confusion, in which we have lost the ground from which to distinguish any differences inherently.” (Douglass 1992:375)

“Intuition temporalises. By this Deleuze appears to mean it adheres strictly to the principle that time-mobility is not a step-child of space, a mere “fourth dimension” of a material reality. Rather, matter must be dealt with as a function of experienced time.” Rather than spatializing time, as science would have it, space is temporalised. “Bergson insists that only in intuition are we forced to recall that nothing is ever finally at rest; and no reading is final......Bergson does not suggest that he will dispose of finality. But he says it is only intuition that keeps us from being seduced by its illusion. Intuition reminds us, whenever we believe we have “arrived”, that this arrival is impossible.” (Douglass 1992:377) Here is the deferment of finality found in Derrida’s deconstructionism, and the counter argument to the almost absurd ‘finitude’ of humanity upon which the Age of Man was built.

There are several crucial points here. Time and again we have come up against this very tendency to quantify what is truly qualitative – to make a Thing out of what is in truth a human quality. As Deleuze insists, “Bergson says, in particular, that before we can discriminate any sort of “difference”, we must recognize that philosophy’s old opposition between the Multiple and the One is false. In fact, there are two types of multiplicity.” (Douglass 1992:376) Nor is this a uniquely Bergsonian viewpoint - Deleuze points out that Bergson “developed his line of thought partly from Riemann, who distinguishes “discrete multiplicities” (spatial) and “continuous multiplicities” (durational).” (Douglass 1992:376) This view of multiplicity, Douglass contends, which “remains completely indifferent to the traditional problems of the multiple and the one,” (Douglass 1992:376) has been reborn in post-structuralism. The “One” is only so when viewed in an instant of spatialised time. Viewed in temporalised space, there is only multiplicity.
Completing the mutual appreciation, Deleuze describes Foucault’s *Madness and Civilisation* as “the most decisive step yet taken in the theory-practice of multiplicities.”” (Douglass 1992:376) Certainly Foucault’s insights into the treatment of the mad grant us a truly sobering perspective upon our own ‘sanity.’

Briefly, in a snapshot of Foucault that can hardly do him justice, up to the 15th century the ‘cosmically’ mad were cast out but left free to wander, and were deemed to have access to secret knowledge; the ‘satirically’ mad were deemed to be making mock of human fallibility, but could equally be wise fools, and again, were left pretty much to themselves. But in the Classical age madness was seen to lie entirely outside of reason - the mad were seen to ‘reject’ reason - and thus were subjected to physical confinement and coercion through brutal treatment, locked up in the lazar houses, (left vacant by the disappearance of leprosy in Europe in the early 18th cent.) along with the poor, the sick, the vagrant, the criminal. Discrimination and segregation of these groups into various different institutions unfolded from there. The differentiation of the mad from the general population of the socially undesirable, and their relocation to the hospital context is perhaps generally regarded as a progressive development, involving both more humane and better-informed treatment. But Foucault maintains that this appealing image is not true, that it conceals the fact that the change was no improvement; if anything it was a continuation of the deterioration in the situation of the mad. Since the Renaissance they had lost their freedom and dignity and had been reduced to silence: nothing they had to say was worth listening to. Further, the treatment was not truly medical in nature and was not based upon genuine scientific knowledge. The doctor controlled inmates with power, not expert knowledge. The hospital was an intensely moralised environment for compelling the inmates back into conformity with social rules through the manipulation of their guilt. Disciplinary control shifted gradually from regulation of the body’s activities towards manipulation of the mind. (Foucault 1995; Cuff, Sharrock et al. 1998:264)
Reality in this reading, through a study of the treatment of the mad, is clearly constructed by those who decide on the nature of sanity. Thus consciousness – conscious decisions – and the nature of the world are intimately bound up, and Deleuze’s comment about *multiplicity* in Foucault’s work becomes clear.

For Deleuze and Bergson, our most fundamental self has no such delimitations between the sane and mad, but consists of an “infinite permeation of a thousand different impressions which have already ceased to exist the instant they are named.” The delineations of sanity are impressions already dead, existing in the past only, as the flow of the real continues to unfold in all its spontaneity and creativity. (Douglass 1992:379)

In Deleuze’s study of Bergsonism, the crucial point is that he has re-imagined Bergson as a precursor of the "post-structural turn": philosophy turning its own powers back upon itself, reflecting upon its own flaws, gaps, and limitations – philosophy as an act of self-consciousness. "He sees Bergson’s *intuition philosophique* as the first clear statement of the post-structuralist turn as method. It is a uniquely human "turning" which keeps us open – keeps open all that, otherwise, in the natural process of the *élan vital* itself,” - the picnoleptic, cinematic ‘death-by-apprehension’ of intellection – "would remain forever closed: Deleuze points out that “it could be said that the living being turns on itself and closes itself”. (Douglass 1992:379)

Like Bergson, Deleuze “sees man as the end-point of creation, for he enfolds all, and "durations that are inferior or superior are still internal to him. Man therefore creates a differentiation that is valid for the Whole, and he alone traces out an open direction that is able to express a whole that is itself open.” Does a tree fall in the forest when there is no-one there to see it? Thus might ask the philosopher who spatializes time. But to the philosopher who temporalises space, we are here, so of course it does. The universe “is organic in the sense that it is virtual becoming in actualisation, and the key movement of that actualisation is the "turn" in which this virtuality (also known as *élan vital*), "gains self-consciousness” – through us. (Douglass 1992:379) We are reminded of
Professor Llinas, and the surprising balance between the products of our imagination and the interpretation of incoming light, that together make up what we see. Clearly, consciousness, in this reading, is the centre of a united universe of composite multiplicities, and the present moment the fulcrum upon which reality hangs. There may no longer be any clearly worked out hierarchical Chain of Being, no God at the top and no grain of sand at the bottom, but the Human Being is back at the centre of the universe, his/her consciousness the locus of the unfolding multiplicities of reality.

In sum, Bergsonism interprets Bergson as a philosopher of 'difference.' It recognizes Bergson's evolutionism, points out his – both monistic and dualistic – schemes of differentiation, by which "a unitary force, or élan vital, becomes actualised in divergent, opposed streams – matter and life, instinct and intelligence," etc. "Evolutionism will always have the merit of reminding us that life is production, creation of differences," (Bergsonism) ....... If, as it appears, Deleuze's later adaptation of Bergson really embraces evolutionism, then post-structuralism (at least Deleuze's version of it) – and, by implication, in Foucault and Butler – "is vitalist in its theoretical base."

Critical vitalism, Douglass summarises, "has been redeemed to a new life by Deleuze's post-structuralist analysis..." (Douglass 1992:380)

d. Conclusion

In this third chapter examining Cultural Performance, we have introduced the notion of narrative – the stories upon which all things hang – as the central thread upon which the beads of our performances are strung. Taking this notion, and adding to it the notion of cultural lag, we have toured through the history of the cultural figure of the cyborg in literature, and noted how time and again the cyborg has represented a very human fear of scientific advance, and of the potential that technology may one day make humanity obsolete.
Examining the figure of the cyborg in contemporary scientific endeavour, we have been introduced to the notion of the planet itself as the 'mother' of all cyborgs, Gaia, and caught a glimpse into a science-fiction future of what may be regarded as the true home of the cyborg – outer space. But the stark reality of contemporary research and development in the real world, where some scientific work is funded and some not, has been shown to be military in nature. It is the development of exoskeletons for US Special Forces that is being funded, and the future posited as most likely to unfold from this work is a 'systems' approach to citizenship, that will see us living in such exoskeletons as we already, today, almost live in our cars. It is a nightmare vision - a Dalek future – in which military advisers to the techno-scientific community ask for such exoskeletons to be more like Predator than the loading machine used by Sigourney Weaver in Aliens – further evidence that narrative remains core to all performances.

Following on from this, the cultural performance of the military-industrial-complex that is now producing these exoskeletons has been examined, and shown to be both an integral part of the capitalist economic system, and profoundly related to the disciplining of society by the increasingly focused technologies of the body that have proliferated unseen alongside the technologies of artefacts. Indeed the Cyborg comes to be seen as the meeting of these two strands, where the body finally becomes the locus of both technological projects.

Here, by way of contrast to this nightmare vision, the author of this thesis presents an outline of a counter-metanarrative to that of the Modernist project: Vitalism. In this examination, we have seen that the demarcation of things and people undertaken in the 16th-17th century is not the only truth being made in the modern world, but that other philosophers have pursued a far more seamless, unified, holistic view of humanity and our place in the universe. Through an examination of intuition and evolution as understood by Bergson and as reinterpreted by Deleuze, we have glimpsed a view of reality that is poised at the crest of an unfolding time-space unity that totally undermines
the intellectual project of scientific materialism, and portrays it as the study of the dead, intrinsically unable ever to appreciate the nature of life.

It is consciousness, and the intellectual courage to properly address it, that sets the vitalistic counter-metanarrative apart from the scientific-materialist, mechanistic, cybernetic, metanarrative of the ongoing Enlightenment project, and in the next chapter, it is consciousness which we must now address.
4. **The Playwright.**


   So our ‘anthropological’ study of the Enlightenment project, its founders and its detractors, brings us finally to a concluding chapter in which many of the loose ends might find a home. The three principle strands of this author’s argument could be summed up as:-

1. the heterogeneous networks of things and people in a non-modern seamless world, as presented by Latour and others

   *fused with*

2. the performative presentation-citation of roles which impute personhood to the individual and derive status from cultural performances, as presented by Butler, Goffman, and others

   *together creating*

3. a network of things and people performing a number of interlocking cultural metanarratives at the heart of which is the story of the cyborg – the epitome of the fusion between people and things and the cultural performance of the future.

   The crucial linkages between these three strands – networks, performances, and cyborgs – moreover, provide the clue as to why the author regards the third of them as central. Theorists of Actor-Networks who have imparted to things a theoretical equivalence to people in their picture of social reality as a heterogeneous web of relations, have not, in this author’s research, understood that equivalence of socio-cultural power to be *performative* – i.e. that the objects in our lives are characters performing specific cultural roles which bring about behaviour in us by their presence, and which contribute directly to the establishment of working consensus. Similarly, theorists of performance have yet to have understood, in this author’s research, how the props with which we work in our daily performances - the kitchen pot which is not not a
are themselves performing roles, allotted to them not only by their makers, nor merely as symbols in the actors' restored behaviour, but also in and of themselves, by dint of their place within the networks in which we are ourselves included, and by which their symbolism impacts upon us, and in their expression of the programmes embedded in their manufacture. This fusion, then, of these two theoretical standpoints, not only relates very closely to, but implies cyborgism. Cyborgism – the fusion of things and people – sits at the fulcrum of the concepts of networks and performativity.

Cyborgology – moreover – this thesis included – may further be seen as performative rhetoric, contributing to the creation of the cultural performance of cyborgism, inasmuch as any statement uttered by the academically qualified may be deemed performative. Not least, Cyborg Performance Art may be seen as such performative rhetoric in its own right. Stelarc may believe that he is a commentator upon the phenomenon of cyborgism, yet at the same time be actually contributing to its formation, its dissemination, be one of the many things and people that are performing it into being. Kac's interactive art, pointing out these very interrelationships between the objects in our lives and the way we live, may himself be helping to perform such complex relationships into being, by establishing them in our cultural milieu as moments of utterance, iterations of the icon of the cyborg.

Ultimately, in this author's opinion, this fusion of things and people, in the collapse of networks and performance, and the creation, at their fulcrum, of the cyborg, must be seen as teleological; the fusion is ongoing, purposive, it has direction, impetus, a goal. This fusion, described by Latour as the proliferation of hybrids between the worlds of the Citizen and Nature, is something which snowballs, becoming ever more complex and intertwined, producing ever more links and relations.

Which means, of course, that it started somewhere, that it has an origin. The Kings and battles history of 16th-17th century Britain presented in the first chapter must be regarded as performative scene-setting for today's world. The Cultural Performance
of the Reformation and of the Scottish and English Renaissance that unfolded through these two centuries was constitutive of the modern condition. It is Henry VIII’s break with Rome that we ‘cite’ in the assertion of a Britishness that only truly came into being with the plans and ideals of James VI and I and his creation of a new Rome (Ferguson 2003). Henry’s redistribution of the wealth of the monasteries amongst the lesser nobility – however unintentional – freed up a great deal of capital that funded a whole new class of merchants and entrepreneurs, whose colonial expansion into the West Indies and beyond in turn funded the Industrial Revolution. The great King set religion aside in pursuit of what he wanted, and many of his subjects took his example. Above all, in an increasingly literate populace reading printed Bibles in English, those who were set on keeping religion foremost were certain that it should not be Rome’s.

The combination of the printing press, monastic property turned into stately homes, and church wealth redistributed by force, and the spread of new ideas through their dissemination in printed form, presents us with a network of things, people, and rhetoric that overturned the mediaeval world and created the modern. There are personalities here – the central characters of grand narratives in which many thousands took part – and the whole cultural performance of the era is clearly contingent upon a multiplicity of different things, from scientific innovations and strong personalities to new ideas and even the availability of old ideas in new form.

The point is that in this nexus of interlocking influences a remarkable transformation came about – what Thomas Kuhn might have described as a paradigm shift (of which more in a moment) – but one which was to launch a newly reconstituted ‘Britain’ upon the rest of the world, establishing a new Roman empire of economic might backed by massive military force; a Roman empire of which James VI and I would have been proud, and upon which the sun never set; an empire which established the modern world as we know it (Ferguson 2003). Crucial to the establishment of this empire, at its very heart and in its very origins, was a reconception of the person as object, and of the object as person – the new economic practice of Slavery, and the new science of
Anatomy. As Foucault put it, new 'technologies of the body' lay at the heart of the new world, whose creation in the 16th-17th centuries heralded the modern condition.

In this chapter, then, we must look to dissect the engines of truth-creation which provided us with the reconception of person as object, and object as person, if we are to properly understand the origins of Cyborgism.

i. Performing the Respectable Scientist in Kuhn's Academy

Performing the Scientist according to the working consensus of what a scientist is, is a cultural performance that also underwent a profound shift during the Reformation - with Bacon's philosophy and Boyle's theatre-laboratory.

Kuhn's (Kuhn 1970) analysis of the growth and maintenance of 'schools' of thought based upon professorial patronage elucidates clearly how this cultural performance unfolded from this time. Today, in the world of technological applications of advanced biomechanics, the professors, in turn, benefit from the patronage of the military. Indeed the policies of the US DoD can in a sense quite literally lead the world's scientists and technologists down the paths it chooses for them, with dissenting voices on the fringes simply unable to fund their research, and thereby attract other researchers, PhD students, and a place in the allocation of academic resources.

Established leaders of their field, in any discursive practice, rapidly construct fiefdoms to perpetuate their own version of things. Indeed, Kuhn eloquently demonstrates that scientific "research [becomes] a strenuous and devoted attempt to force nature into the conceptual boxes supplied by professional education." (Kuhn 1970:5) - i.e. personal fiefdoms consolidate the power of their creators and leaders by controlling what is allowable as 'scientific truth', teaching their versions of that 'truth', and suppressing anything else. The process becomes less and less obvious, more and
more insidious, as the fiefdoms proliferate and as educational establishments multiply and expand. The myth that scientific progress is a matter of gradual discovery and accumulation is thoroughly debunked by Kuhn.

Scientific revolutions, such as that in which Boyle played such an important part, in Kuhn's analysis, are re-characterised as the moments when the pressure of new ideas forces the atrophied status quo to perform an about-face, and to re-formulate itself upon the basis of newly established paradigmatic underpinnings. "When the profession can no longer evade anomalies that subvert the existing tradition of scientific practice - then begin the extraordinary investigations that lead the profession at last to a new set of commitments, a new basis for the practice of science. The extraordinary episodes in which that shift of professional commitments occurs are the ones known in this essay as scientific revolutions. They are the tradition-shattering complements to the tradition-bound activity of normal science." (Kuhn 1970:6)

In essence, what Boyle and his contemporaries and immediate descendants achieved was precisely this: a tradition-shattering upheaval in the tradition-bound activity of normal science, but one so completely shattering that it has succeeded in recasting all prior scientific endeavour as so much confused mythological mumbo-jumbo. But even a brief look at the methods and approaches of scientific activity prior to this 16th-17th century revolution casts doubt on such a judgement.

In his discussion of the views of historians of science, Kuhn shows how "The more carefully they study, say, Aristotelian dynamics, phlogistic [a substantival vitalistic] chemistry, or caloric thermodynamics, the more certain they feel that those once current views of nature were, as a whole, neither less scientific nor more the product of human idiosyncrasy than those current today." (Kuhn 1970:2) Furthermore, to consign these pre-17th century approaches to mythology is to undermine post-17th science too. "If these out-of-date beliefs are to be called myths, then myths can be produced by the same sorts of methods and held for the same sorts of reasons that now lead to scientific
knowledge. If, on the other hand, they are to be called science, then science has included bodies of belief quite incompatible with the ones we hold today." (Kuhn 1970:2)

So, then, there is one myth that is still current, and that this analysis must perforce undermine: the myth of scientific progress. "Out-of-date theories are not in principle unscientific because they have been discarded." This realisation, of course, makes it extremely difficult to see scientific development as "a process of accretion." (Kuhn 1970:2) So Kuhn must reconceive the history of science, no longer as a long tale of progressively deeper and better understanding, but as a series of plains, upon which the normal activity of scientific research is undertaken, and between which are struck the great upheavals of scientific revolutions. These plains, (in a parallel concept to the Foucauldian episteme), he designates as paradigms - "universally recognized scientific achievements that for a time provide model problems and solutions to a community of practitioners." (Kuhn 1970:8)

Truth-creation in scientific circles, then, is a matter of funding and of personal fiefdoms. That is not to say that empirical science cannot discover truths about the behaviour of objects in laboratory conditions, but that the experiments that are done and the definition of the laboratory conditions in which they are done are subject to social conditions that pre-figure the outcomes and the theories that are built on them. This process, moreover, is intimately linked with the on-going creation of the cyborg.

Boyle and his contemporaries invented an entirely new scientific philosophy, in which the mute objects of a Nature that has always already been there revealed to the enquirer their secrets in the confines of entirely artificial and controlled environments - the laboratory - through experiments that deliver up wholly fabricated facts. A Nature thus stripped of its traditional divinity becomes relegated to a domain outside of that to which we will accord respect. Indeed it is only people, in the 'New Constitution,' to whom we will accord such respect: not animals, nor things. Crucially, the Body, at the hinge of this new demarcation, seems to be treated with due, or no respect, according to
social status. To the new scientists, the Body is an object of Nature worthy of experimenting upon in laboratory conditions. At first it is only dead bodies, but soon, in the new field of scientific medicine, it is living bodies too (Foucault 1994). The separate entities established by the new science -Person and Object – begin to become conflated, in the most sensitive of Latour’s hybrids.

ii. Wiener’s Victory at the Macy Conferences

The achievement of Wiener at the Macy conferences in the 1940s and 50s is a prime example of Performing the Scientist in the sense we have just discussed, the setting of the conditions in which science is allowed to flourish, and the on-going creation of the cyborg and the terrible consequences that this can have for our sense of Humanity.

As we saw earlier, cybernetics achieved no mean feat of scientific paradigm shifting - moving the image central to the common conception of life from that of an industrial machine to an electronic system. But as Hayles shows us, this development was as much a part of Foucault’s discursive formation game as any other scientific ‘innovation’.

What cybernetics, as a science, requires, to quickly recap, is the reification of information, and its re-constitution as a flow or pattern independent of its instantiation. During the foundational era of cybernetics, at a series of annual conferences from 1943 to 1954, known collectively as the Macy Conferences, some of the most distinguished "credible, trustworthy, well-to-do" researchers in the US techno-scientific culture of the mid-20th century met to formulate a "theory of communication and control applying equally to animals, humans, and machines." (Hayles 1999) All these were ‘objects’ worthy of scientific study, in the mindset of Boyle’s descendants, and therefore a common language should be possible to describe them all.
To achieve this, they needed a theory of information, a model of how the brain worked as an information-processing system, computers that could imitate biological systems, and an overarching theory. "The result of this breathtaking enterprise was nothing less than a new way of looking at human beings. Henceforth, humans were seen primarily as information-processing entities who are essentially similar to intelligent machines." (Hayles 1999:7) But of course this was not designed to bring human beings down to the level of machines - quite the contrary - this was about bringing machines up to the level of human beings, as self-regulating, self-directed mechanisms. This was a new scientific paradigm capable of granting advanced things the status of citizenship. (An idea explored by Gibson.) The representation of the objects of nature had come full circle, through this new theory of what it means to be human. The prospect of extending the franchise to things, constituted as artificially intelligent machines, came a step closer.

Information, for the majority of the participants of the Macy conferences, is devoid of meaning. It consists solely in the probabilities of message elements, pared down to binary code. This is important because for cybernetic theory to work information must be free to move from context to context without changing its values. Specifically, any piece of information, in cybernetic theory, cannot be a serious speech act. The discursive formation of which it is a part must of necessity be one that is divorced from human context. It must become, in effect, a laboratory item, divorced from real-world conditions. This definition "allowed information to be conceptualised as if it were an entity that can flow unchanged between different material substrates." (Hayles 1999:1) Even Shannon, the originator of this theory, "did not see 'too close a connection between the notion of information as we use it in communication engineering'" and the semantic questions of group communication being discussed at the eighth Macy Conference. "He did not want to get involved in having to consider the receiver's mindset as part of the communication system." (Hayles 1999:54) As Dreyfus points out, "When illegitimately transformed into a theory of meaning, in spite of Shannon's warning, information theory and its vocabulary have already built in the computer-influenced
assumption that experience can be analysed into isolable, atomic, alternative choices. As a theory of meaning this assumption is by no means obvious." (Dreyfus 1979:165)

Perhaps one of the primary problems with the Macy Conferences and their formulation of what ended up as a generalised (and decontextualised) information theory, was their attitude. As Hayles sums up: "In the rhetoric of the Macy Conferences, 'objective' was associated with being scientific, whereas 'subjective' was a code word implying that one had fallen into the morass of unquantifiable feelings that might be magnificent but were certainly not science." (Hayles 1999:54-55) Performative rhetoric, as we saw earlier, can have great power, and the huge networks attaching themselves to the two words, 'objective' and 'subjective' are like two opposing armies on a Cartesian battlefield. The label, 'subjective', was used at the Macy conferences as a tool to undermine and discredit several attempts to formulate an information theory that would take meaning into account. But of course, in this way, the rationalist, mechanist, intellectualising approach to the problem pre-ordained its outcome: a rational, 'objective' one.

Thus the Macy Conferences, in short, were reflexive. There were, indeed, as Hayles protests, alternatives to the 'objective' outcome. MacKay's information theory, for example, also presented at the conferences, triangulated between reflexivity, information and meaning, in a formulation wherein "subjectivity....is precisely what enables information and meaning to be connected." (Hayles 1999:56) Needless to say, it was rejected, in the US at least, although the British school continued to work through its implications for some time thereafter.

"Stripped of context [information] becomes a mathematical quantity weightless as sunshine, moving in a rarefied realm of pure probability, not tied down to bodies or material instantiations. The price it pays for this universality is its divorce from representation. When information is made representational, as in MacKay's model, it is conceptualised as an action rather than a thing. Verb-like, it becomes a process that
someone enacts, and thus it necessarily implies context and embodiment." (Hayles 1999:56) Indeed, one might even venture an analogy between the Shannon-Wiener decontextualised information theory as objects and events moving through time as a fourth dimension, and MacKay's action based information theory as a durée réelle version of information: where information and its material substrate are viewed as a coherent whole, and as a process.

As Hayles sums up: "The point is not only that abstracting information from a material base is an imaginary act but also, and more fundamentally, that conceiving of information as a thing separate from the medium instantiating it is a prior imaginary act that constructs a holistic phenomenon as an information/matter duality." (Hayles 1999:13)

This cybernetic information theory changes the very way in which we perceive not only ourselves but the world around us. It is not unlike the invention of perspective back in the 15th century - arguably one of the intellectual precursors of Boyle's new science, a century later. To briefly recap, Brunelleschi is credited with creating, in the early fifteenth century, the first painting in 'true perspective.' What he did, in effect, was reduce reality to a single point, and draw straight lines away from it - making it into a 'vanishing point.' Onto the resulting grid reality was made to fit, with the effect that the human eye was deceived by a powerful illusion suggesting 'depth' in the two-dimensional pictorial representation. It is arguable, however, that this innovation actually robbed pictorial art of its 'true' depth - its symbolic representation - in favour of a flat and largely meaningless world of points and lines and visual trickery. Perspective in art, in short, was a choice, at a particular cultural and historical moment, and one which reified mathematical sleight-of-hand over symbolic meaning, and had more to do with cultural alignment than the revelation of the truth. Perspective is, after all, a way of seeing, the geometry of which had been around for two millennia by the time the Enlightenment came upon the scene. Likewise, Cybernetic information theory is a way of seeing, and
one which cuts out the messy 'subjective' humanity and meaning from the objects it
describes, and the world which it performatively creates.

iii. Performing the Human CD-Rom into Being?

The implications of Wiener’s re-imagining of the human as a machinic system are
of course that one day we shall be able to ‘upload’ ourselves into computers – however
laughable such a suggestion may be. But in cyberpunk fiction and Cyborg Performance
Art this possibility has been extensively explored. Gibson’s entire fictional world depends
on it as a foundational premise. Does Stelarc think we could all end up like Dixie Flatline
in the Gibsonian model, stored on a CD-Rom? He is quick to deny the suggestion that it
may one day be possible. Common sense, after all, dictates this. His argument is that,
of course, “uploading identity or in a sense uploading the body - body data” is unlikely to
ever happen. The way in which he describes the idea is dismissive: to say, for example,
“let’s jack this guy in and suck out all the essence and like leave this dead body behind,
and then we have an artificial intelligence on the web,” is ridiculous. Common sense
dictates, of course, that “intelligence always has to be embodied.”

This author - and Katherine Hayles – agree. Indeed, as Stelarc elaborates, “A
brain isn’t a brain without legs, because a brain without a point of view, without different
points of view, without a vision that provides those different points of view, would just be
a lump of quivering, grey-pink jelly-like material.” Virec, the billionaire industrialist in
Gibson’s nightmare world, is precisely that – a brain in a vat of chemicals, connected up
to a massive computer.

However Stelarc is a Performance Artist, and as we have implied may be
performatively contributing to the creation of the Cyborg. It is his firm belief that,
de spite the obvious failings of the simple ‘Dixie Flatline’ and ‘Virec’ models, “That’s not to
say that in our future human history we won’t have hybrid human-machine systems or
intelligent machines.” Indeed he thinks it will one day be possible “to programme or
construct artificial intelligence and artificial identities." But in his damning critique of the entire project of artificial intelligence, *What Computers Can't Do*, Dreyfus likens AI to alchemy (Dreyfus 1979) – what Kuhn would describe as an equally scientific project – but one which pursued an unobtainable ideal; a research cul-de-sac. As Dreyfus succinctly describes: "It is precisely the role of the programmer to make the transition from statements which are meaningful (contain information in the ordinary sense) to the strings of meaningless discrete bits (information in the technical sense) with which a computer operates. The ambition of artificial intelligence is to program the computer to do this translating job itself. But it is by no means obvious that the human translator can be dispensed with.” (Dreyfus 1979:166)

Dreyfus tears down notion after notion, shows up the fallacy of assumption after assumption, in his seminal work. He describes some of the literature of the project as either "incoherent" or merely "gibberish", (Dreyfus 1979:179), and in the introduction to the Revised Edition acknowledges that his critique effectively called the project to a self-aware halt. In short, as we have heard Greenfield and others also assert, "a 'machine' which could use a natural language and recognize complex patterns would have to have a body so that it could be at home in the world." (Dreyfus 1979:304) Such "artificial men," moreover, would have to process information in a "nondigital" way. "Programming present machines to behave with human intelligence" he concludes, is simply not, and never will be possible. (Dreyfus 1979:304) So Stelarc's belief that "our human history or our future will be inhabited by all sorts of creatures based both on carbon chemistry and genetic coding and silicon chip circuitry and other kinds of new sort of quantum mechanical devices" seems somewhat far-fetched. But, as Dreyfus acknowledges, "three hundred years after the alchemists we did get gold from lead (and we landed on the moon), but only after we abandoned work on the alchemical level, and worked to understand the chemical level and the even deeper nuclear level instead."

What is certain is that, cul-de-sac or no, the "long reign of alchemy has shown that any research which has had an early success can always be justified and continued..."
by those who prefer adventure to patience,” (Dreyfus 1979:304) and there is far too much money invested in what does work in the cybernetic project. It is also clear that the momentum of cyborgism, the proliferation of hybrids that has been gathering pace for over four hundred years, will be very hard to stop. In the networks of things, people and rhetoric that have built up over those centuries, meaning, lived experience, and the symbolic language of human consciousness have time and again been sidelined, set aside, avoided, circumvented, in the pursuit of a temporary fix that works – to a defensible extent. It is as if the Modernist project, the New Constitution, which began with the theoretical separation of Citizen and Object and then conflated them, had some internal logic to it that must always, of necessity, push aside meaning in favour of meaningless, favour the abstract over the symbolic.
b. The Problem of Agency.

Which brings us, at last, to the problem of Agency. If we are to distinguish between the person and the object, between people and things, in a way unlike the Modern Constitution that has on the contrary proliferated the hybrids between the two that is producing the cyborg, if we are to be able to say what is unique and different about a person that distinguishes them from a thing, then surely it is in the concept and enaction of the Will. To have Will, to be an Agent, requires both consciousness, and an individual identity. But we have already spent much time in this thesis deconstructing individual identity. Indeed, we must ask ourselves: If it's all performance, who is writing the script? Is there any such thing as the Individual if the Enlightenment Subject is just another role?

i. Nietzsche's Grammar - No-one and No-thing 'in-charge'?

We strike up here against what Nietzsche defined as the 'metaphysics of substance.' Basically, all the classic 'psychological' categories - the ego, the individual, the person - derive ultimately, in Nietzsche's view, from what he identifies as an illusion of substantial identity. This illusion is in turn derived from a belief in language, and, more precisely, in the truth of grammatical categories. Michel Haar relates, in his commentary on Nietzsche,

"It was grammar, the structure of subject and predicate, that inspired Descartes' certainty that 'I' is the subject of 'think,' whereas it is rather the thoughts that come to 'me': at bottom, faith in grammar simply conveys the will to be the 'cause' of one's thoughts. The subject, the self, the individual,
are just so many false concepts, since they transform into substances
fictitious unities having at the start only a linguistic reality." (Butler 1990:12)

So perhaps the answer to the question, 'who is writing the script', is that no-one,
and no-thing is; that there is no agency at work, only process, and the strange logic of
the heterogeneous network. But whose "will" wishes to be the "cause of one's
thoughts"?

In the end, this is not the place nor is it within the remit of this thesis to discuss
in any real depth this most crucial of questions, the ramifications of which can and have
filled many, many books. Ultimately, as Shutz has said, social reality "has a specific
meaning and relevance structure for the human beings living, acting and thinking therein.
By a series of commonsense constructs they have pre-selected and pre-interpreted this
world which they experience as the reality of their daily lives." (Coulter 1979:9) It is on
this subjective level that this author understands the concept of agency. Lived
experience, in other words, rather than objective knowledge, must be relied upon to
answer this question, and it is in lived experience that agency, or intentionality, as
Merleau-Ponty puts it, resides. (Bannan 1967:46)

Merleau-Ponty, in fact, especially in his rediscovery of Bergson – contemporary
with that of Deleuze – and his reformulation of some of Bergson's ideas, provides an
especially interesting attitude to this most fundamental of questions. For Merleau-Ponty,
it is in perception that the clue to a reformulation of this most profound of philosophical
questions resides. The "naive" version of this problem, according to Merleau-Ponty, runs
like this: the Body is a thing standing between self and objects. As such, it requires some
"device to make it an instrument serving perception, rather than a screen preventing it."
Such devices range from the pineal gland (Descartes) to various "zones of association"
but in all such formulations "the instrument is still a thing or object; the various devices
are all ways of allowing a physiological representation of the perceived object to be
generated in the body; but a representation of a perceived object is itself an object
perceived, and in its regard all the traditional Cartesian problems still remain.” (Bannan 1967:52)

The separation of mind and matter that both Descartes and Kant resorted to, the withdrawal of soul from body, is regarded by Merleau-Ponty as a mistake. For him, this split is to over-identify with the mental aspect of humanity, at the expense of the physical and of the _vital_. For him, it is all a matter of levels, levels distinguished by the extent of integration, from specificity to unity, and that these levels are far from being mutually exclusive. If, for Descartes and Kant, the body and the soul must somehow be separate entities, for Merleau-Ponty, the soul, “without the body as its means of expression” simply ceases to be anything at all. (Bannan 1967:54)

This vision of the relationship between the body and the soul as one almost of harmonics, where “the body is the acquired dialectical soil upon which a higher “formation” is accomplished, and the soul is the meaning which is then established” (Bannan 1967:54) re-unites these sundered entities and brings the world of lived experience back into direct contact with the physical world of objects. This reconceptualisation builds upon Bergson’s concept of the higher individual whose consciousness of duration places individuality at the crest of an unfolding time-that-is-space. Here, agency – the Will of the individual – may reside in the ‘higher’ regions of soul whilst being both a direct result of experience in the heterogeneous networks of things and people and all the roles and cultural performances to which we are subject, and at the same time being a unique and direct contributor to the ongoing evolution and incremental recreation of each of those roles and performances and all the objects which unfold from such activities.

The notion of seamlessness which Latour brought to Nature and Culture in his deconstruction of Modernity here reunites the physical and the metaphysical. This soul-body seamlessness suggests that while Nietzsche is correct in proposing that our conception of self is a product of language and of the social context within which we
operate, it is in fact something not to be derided and disregarded, but, on the contrary, regarded as perhaps the greatest accomplishment of language – that its impact upon the physical has been to generate a higher level of unity of the many specificities of a bodily existence that can work in the opposite direction. We are, in short, both products and producers of ourselves.

Indeed, this brings us back to the very beginning of this thesis, where we introduced Performance as one of the most ancient of human activities, arguably, a constitutively human activity. The act of language – the physical movements of the larynx manipulating inhaled and exhaling air, accompanied by bodily stance and gesture – the act in which one speaks a word - is to perform the score which both speaker and hearer share knowledge of as the bearer of a specific meaning: and this act is both a product of a pre-existing score, a role cited, and also producer – albeit by infinitesimal increments – of a new score, a new role to cite. This production, this ability to perceive possibilities inherent in the pre-existing role and choose from amongst them to present a new performance, a new variation of the role, is driven by the Will.

For all that this understanding of Agency presents us with a chicken-and-egg conundrum in its earliest hominid origins, the bi-directional seamless flow between self and other, body and soul, making of us both product and producer of our social intercourse and of the networks of things and people, seems to this author the most plausible of all explanations. It also has implications for our present predicament, and our potential future.
ii. The Scrabble Board

Stephen Hill, in his book, "The Tragedy of Technology," (Hill 1988) in deconstructing what he terms the 'cultural texts' of technologies to find the values, assumptions and implied knowledge that lie behind them, discovers the cultural power of today's technology in the alignment between cultural values and technological systems in the eighteenth century. In this thesis we have traced this history even further back. But Hill focuses upon industrialisation to underline his point that so-called individual applications of technology always rely on the technologies that have previously been allowed entry into our culture, and influence upon our lives.

This 'soft' technological determinism is pushed further by Langdon Winner (Winner 1986), for whom technology embodies not merely cultural influence but politics, for whom, if technology is not politics in itself, it is at the very least politics by other means. Technological artefacts, for Winner, are often nothing less than objects created to "enhance the power, authority, and privilege of some over others" (Winner 1986:32) The example he gives is the planning and building of low height motorway over-bridges around Long Island. These over-bridges were designed to be only nine feet tall so that buses would not be able to service the area, and therefore created a situation in which ethnic minorities were on the whole excluded from the area as they generally relied on public transport. The over-bridges therefore embody racism.

Moreover, Winner describes what he terms 'inherently political technologies'. Such technologies either require or are compatible with political social relations. A prime and topical example of a technology that requires a specific political environment in which to operate, is nuclear power. He points out that nuclear power requires a "techno-scientific-industrial-military elite" (Winner 1986:33) Solar energy on the other hand can be compatible with decentralised systems both technically and politically, because it enables small communities to manage their own affairs.
Both these arguments dovetail neatly with MacKenzie and Wajcman's ideas on technological enframement. (MacKenzie and Wajcman 1992:3) In short, as both Hill and Winner suggest, technologies add on to each other, and like a scrabble game, the parameters for each new innovation become more and more constrained as the board fills up, and the options for change become more and more contingent. Every move, every development, is circumscribed by the last.

Discounting the notion of 'hard' technological determinism – the suggestion that somehow technology itself is 'out of control' and determining its progress by itself - these arguments point toward society and technology being two sides of the same coin, and suggest that the actual hardware of technological development is merely the shadow projected by a socio-technical plot. The implication is that technology in today's world is the result of many, many strategies, used at one time or another over the last few centuries, some virtuous, some not, which taken as a whole represent a truly Machiavellian achievement: "to maintain power for a little longer in spite of enemies and adverse fortunes," (Machiavelli and Bull 1999) on the part of the governments of the day and their successors, in a continual line of deliberate enframement.

This is a vision of society run by Machiavellian Princes, Nietzschean Supermen unafraid to exercise the Will without morals or ethics, busy establishing their own networks of power in which many of the strongholds they create to keep the general populace in place are made of electricity, copper, meters – even, and perhaps in particular - petrol pumps, and the vast geopolitical networks responsible for what comes out of them and feeds the metal skins with which we so closely identify and upon which the performance of our daily lives so heavily relies - our cars. This is a vision of modern society in which the hybrids that have proliferated between a falsely separated Nature and Culture are the stuff of Foucauldian power/knowledge matrices, embodiments of our domination. This is a vision of modern society in which we and our technological artefacts are all performative actants citing from the canon of disciplination.
James VI and I's new Roman Britain has indeed come of age, and the technology of our "bread and circuses" (as Juvenal described the means of the patrician's domination over the plebeians) has become so advanced and so ubiquitous that its reach is global, and its depth has erased from daily concourse our very souls. As early as AD 100 Tacitus quoted Calgacus, a British chieftain, as saying: 'The Romans have exhausted the land by their plunder. Robbery, butchery... they create a wasteland, and call it peace.' Juvenal advised new governors to 'spare a thought for the poor locals - you'll find they've already been bled dry.' Some historians believe that this exploitation caused the provincial population to fall, which in turn contributed to the decline of the Empire (PageWise 1911). In today's Roman empire it is the very survival of the planet that is at stake (Lovelock 1979).

c. Conclusion

In this fourth chapter then, we have examined how rhetoric forms its own part of the seamless fabric of people and things in the networks that constitute our societies, and how scientific advance is more often the personal victory of powerful men uttering the strongest statements than anything to do with scientific verity. The modernist project is shown to be teleological in this regard, beginning in the renaissance and moving towards a cyborg future, and those who contribute to its unfolding narrative are this society's winners.

We have also looked deep into the fundamental question of agency, and found, with Merleau-Ponty (another rediscoverer of Bergson) that subjective, lived experience, is ultimately the only arbiter of truth. His vision of the relationship between the body and the soul as one seamless mutual inter-dependence re-unites these sundered entities and brings the world of lived experience back into direct contact with the physical world of objects. In this formulation, language, interaction, performance, become both the creation and expression of our identities. We are, in fact, both products and producers of ourselves.
But according to the scrabble board notion of technological advance we have then looked to, in this chapter, with its multiple Machiavellian strategies laid one upon another in a network of competing influences, it would seem that the proliferation of hybrids, the ongoing, snowballing creation of the cyborg, is tantamount to unstoppable. It is also, clearly, both a product of the scientific materialist project, and a means by which to defend and further it. As such, it is also part of the movement which has continually set aside lived experience, human symbolism, and meaning, in favour of the abstract, the rational, the objective – a construction of a duality where there is in fact a holistic whole, if one is to view it from a non-scientific-materialist perspective.
5. Conclusion.

We have argued that Performance is a constitutively human activity, and that it is by nature a repetition, a display of "restored behaviour" (Schechner 1985). Throughout this thesis we have returned time and again to the notion of performance, and to theoretical notions such as performativity, to understand the cultural figure of the cyborg. Alongside this, we have examined the truth creation process of the scientific-materialist project, and found it wanting in humanity. The synthesis of notions drawn from performance studies and science studies presented in this thesis has outlined how the nature of capitalist endeavour, as fuelled by the new objects created by science, requires the performance of new kinds of cultural identity. We have seen how the nature of those objects themselves, and the way in which science creates them, may be seen as the performance of a new cultural identity in its own right.

We have examined through the lens of performance the nature of human identity. Through an analysis of the presentation of self we have elucidated that the Self is constituted and shaped by the performance of roles, and that the process of interaction defines the performance that defines the self. Examining the performance of roles itself, we have seen how performativity, as citationality, elucidates for us a picture of the Self as morphologised, sexed and gendered by the interweaving of the many sets of norms and cultural codes of a particular time, into which it grows and which its existence is a citing of, a reiteration of. Moreover, in our examination of the presentation of status, breaking down these norms and cultural codes into 'serious speech acts', we have seen that it is their place in the network of other serious speech acts, and nothing more, which gives speech acts their seriousness, and thus makes them statements – norms and codes whose citation carries weight, and imputes to the Self the status that will help sway a working consensus in one individual's favour.
We have attempted to step outside of Western society and view it as a totality, to step beyond the boundary divisions that demarcate the disciplines of modern thought and see our culture as an inter-related whole, with a seamless fabric. In doing so we have seen how at the roots of the Modern a false split between Nature/Things and Culture/People, a false and radical break from the past into a non-time of permanent present, took place. The new society this created pretended its citizens were the sole arbiters of their own destiny, when manifestly it was the production and mobilisation of objects that glued that society together, gave it substance, and provided the flow of communication between its citizens.

We have looked to the nature of 'things' in our society, and through an understanding of the politics of artefacts and of actor network theory elucidated that objects indeed carry far more weight in our everyday lives than the Modern constitution would have us believe, that society is made up not of human interaction, but of human interaction with each other and with countless things. Moreover, we have seen that the performance studies model already applied to human beings must also be applied to these very things, for a true picture of modern society to emerge. Things – carefully demarcated by modernist political philosophy from people – as thing-actants, have come to play at the very least an equal role in the creation of our identities and the day-to-day decisions of our lives. Through the lens of disability studies, we have seen that the objects and artefacts we surround ourselves with do indeed carry performative power in the formation of our identities, and thereby our societies. We have seen how this feeds into an understanding of the central figure of this thesis – the Cyborg.

When the individual performances and performative actions of all the actants in society – both human and non-human - are put together, great overarching social, or cultural performances come to light, that can in turn be read. This notion of Cultural Performance - a holistic perspective on history, society, literature, and culture - enables us to see not only the long pedigree of the cyborg as a cultural figure, but what it means in relation to the march of scientific progress. We have seen how narrative – the stories
upon which all things hang – is the central thread upon which the beads of our performances are strung. Taking this notion, and adding to it the notion of cultural lag, we have toured through the history of the cultural figure of the cyborg in literature, and noted how time and again the cyborg has represented a very human fear of scientific advance, and of the potential that technology may one day make humanity obsolete.

Examining the figure of the cyborg in contemporary scientific endeavour, we have seen that it is the development of exoskeletons for US Special Forces that is being funded, and the future posited as most likely to unfold from this work is a 'systems' approach to citizenship, that will see us living in such exoskeletons as we already, today, almost live in our cars. It is a nightmare vision - a Dalek future – in which military advisers to the techno-scientific community ask for such exoskeletons to be more like Predator than the loading machine used by Sigourney Weaver in Aliens – further evidence that narrative remains core to all performances.

Following on from this, the cultural performance of the military-industrial-complex that is now producing these exoskeletons has been examined, and shown to be both an integral part of the capitalist economic system, and profoundly related to the disciplining of society by the increasingly focused technologies of the body that have proliferated unseen alongside the technologies of artefacts. Indeed the Cyborg comes to be seen as the meeting of these two strands, where the body finally becomes the locus of both technological projects. In an examination of how rhetoric forms its own part of the seamless fabric of people and things in the networks that constitute our societies, we have seen how scientific advance is more often the personal victory of powerful men uttering the strongest statements than anything to do with scientific verity. The modernist project has been shown to be teleological in this regard, beginning in the renaissance and moving towards a cyborg future, and those who contribute to its unfolding narrative are this society’s winners.
Throughout the thesis we have contrasted the scientific-materialist story with the holistic voices of those for whom an appreciation of the whole is paramount for true apprehension of the real. Time and again, we have witnessed the Cyborg at the fracture between the linear and holistic. We have examined the counter-metanarrative to that of the Modernist project: Vitalism. In this examination, we have seen that the demarcation of things and people undertaken in the 16th-17th century is not the only truth being made in the modern world, but that other philosophers have pursued a far more seamless, unified, holistic view of humanity and our place in the universe. Through an examination of intuition and evolution as understood by Bergson and as reinterpreted by Deleuze, we have glimpsed a view of reality that is poised at the crest of an unfolding time-space unity that totally undermines the intellectual project of scientific materialism, and portrays it as the study of the dead, intrinsically unable ever to appreciate the nature of life.

We have also looked into the fundamental question of agency, and found that subjective, lived experience, is ultimately the only arbiter of truth. The relationship between the body and the soul as one seamless mutual inter-dependence re-unites these sundered entities and brings the world of lived experience back into direct contact with the physical world of objects. We are, in fact, both products and producers of ourselves.

But according to the scrabble board notion of technological advance it would seem that the ongoing, snowballing creation of the cyborg, is tantamount to unstoppable.

The problem of agency with regard to cyborgism then is that there is simply not enough of it. If agency, the exercising of the Will, is indeed something that is part of a bi-directional flow in the internal unity of soul and body, then the scientific-materialist sundering of this flow, setting aside soul as something not to be taken into account, is a project that concretises the body, stops the internal flow with a view to making the body permanent and, perhaps most importantly, no longer able to exercise agency; worse still,
malleable only to an external Will. This is a project which seeks to make of us, through its persistent pursuit of hybrids, the very workforce envisaged by Lang in his seminal 1926 film.

The cyborg, from its very inception in the Golemic myths, is a slave to another’s Will power. The Machiavellian princes whose strategies have helped to weave our society have together brought us to the verge of a Brave New World.

So what of the future? What does the trajectory of the cyborg hold in store for us? For Baudrillard at least, the subject is no longer a valid vantage point on the real, and thus the privileged position has shifted to the object, more specially to the hyperreal, the simulated object. For Baudrillard this is a fatal strategy. (Baudrillard 1990) The object is supreme, extreme, and fatal. As Baudrillard says, “We witness the loss of subjectivity on the one hand, and the intervention of the object itself in the game in a fatal, decisive and determinant way.” (Bayard 1996) The cyborg is clearly a figure for this surrender to the object. The trajectory of modernism towards the cyborg, then, in these terms, is a fatal strategy. History has taught us that resistance is useless. The cyborg is being performed into being, and there is no stopping it – except perhaps that the engine of its creation, our military-industrial-complex, first defeats the planetary cyborg within which we live, and we ourselves become the victims of its ecological demise.

In the meantime, for those who see the fatal strategy for what it is, there remains the opportunity to experience the world from the holistic perspective – for a little while longer at least.
6. Appendices

a. Transcripts of Interviews

i. Ju90

**Interview with Ju Gosling**

Undertaken at her home in North London 8\textsuperscript{th} January 2001

**David:** The generic first question – coming from the identity perspective - do you think you have changed as a person in yourself as a result of your impairment.

**Ju:** I dunno, I mean, do you mean have I changed identity because I certainly have, or do you mean have I changed as a person?

**David:** well you've answered the question already in a way – tell on

**Ju:** Goodness it's the usual thing – it is – the generic question, how on earth do you get into it? I mean I think one thing I found interesting around the whole question of identity is because I identify as a woman, and because I identify as a lesbian, then I'm very well aware that my identity as a disabled person is just one of several. And I think I say somewhere in the thesis that you know that they're all important to me but none of them define me. But in terms of whether there's a kind of pure essence I don't think that's true either. Because you know you interact with the whole of the world and with yourself through these sets of identities. I've certainly over the last ten years developed a very strong identity as a disabled person, and yet although my impairment levels have changed in that time - specifically ten years ago – more and more I look back and I realise that from the social model of disability I've always been disabled. I've had health problems and I've had visual problems – right from very early days – you know probably from the time that I was born. And certainly in terms of – I wouldn't say that I'd had any significant mental health problems, but having acquired my medical records I see that I
was tagged as having mental health problems at quite an early age, so again in terms of a social model of disability, which makes up my identity, then I think that has affected my treatment. You know certainly I've had a couple of episodes where I've been misdiagnosed as suffering from stress when I've actually had kind of very concrete measurable organic problems – which I'm sure – well I think it's been quite widely documented, that as soon as you get any kind of mental health tag on your medical records that will always be the first thing that's brought up. But I didn't identify as disabled at any of those points. you know and I think the crucial thing for me has been the kind of identity change, and that certainly started ten years ago. And I'm not sure, it was obviously a kind of a journey and a coming out process, I mean it is – I think I make analogies in my work to kind of coming out as lesbian or gay – it's not something that suddenly kind of a light goes on, and there goes an identity change, it is a slow process, but I was fortunate in that I was already in contact with disability rights activists who very clear about social models of disability, identity of disability being built around oppression rather than impairment. So it was probably a kind of quicker journey than it could have been.

I'm trying to think, in terms of how that's changed, I mean obviously it's changed in terms of this is another identity that I have and that's very strong, probably I do reclassify a lot of my experiences now, that I was having before, because like I said you know that I had impairments before, that I would have classified as personal but actually in a way they've been depersonalised because the more you have a kind of identity changes - you know things are being done to you because you belong to a group – the less you're likely to internalise, and the more you're likely to sort of see it differently. So yeah it's probably affected the way I see other experiences and you know just relate to things. I mean I think it has a huge impact on the way that I relate to the world. But I'm not sure how you would quantify it.
David: What sort of relationship do you think would you say between the disabling that society brings about and the impairment that prevents you from achieving certain things that you would have done before.

Ju: I always think ultimately, and I mean I do say this in my work, but I think it’s something I believe in more and more – you can’t actually look at a disabled body and a non-disabled body in a social model way, because I do very much believe that all of us have not only got strengths and weaknesses - whether that’s intellectual or physical - you know, I don’t know how you’d describe mental health in there, perhaps emotional – but also they’re very much variable over a lifetime. And on top of that there’s a huge amount of impact on those abilities in terms of not just environment but - I’m doing an art-movement piece at the moment, where I’m also looking at things like, well, temperature affects our movement, environment affects our movement, fear, confidence, all of these things affect our movement so even the sort of underlying physical abilities, if they’re the same, can still be very different according to where you are. Then of course you’ve got the whole sort of socio-economic factors to bring into it.

David: It’s almost like a kind of Deleuze and Guattarian assemblage, you can’t really pin anything down, it’s just what’s happening at that moment in time: it’s all about context.

Ju: Well I think that’s right – and it’s particularly true of impairment – you know if you look at the way that people expect that their abilities will alter from being a child, being a young person, through to being an old person, and during episodes of illness, but like I said there are all these other things as well, so – and I think also, I mean, you know, maybe the body is the sort of one essentialism, outside of that - you know – I am who I am and I can do what I can do, the problems in my life are kind of, you know – yes in some ways it’s a problem for me, for example my helper’s just gone to do my shopping, that’s something that I can’t do. But then as Germaine Greer pointed out to me a couple of years ago, most men, most married men never do their own shopping
anyway, what is – you know, why do I have a completely different value system, because Roy’s (her helper) cleaning my bath or he’s doing my shopping. When somebody else who is physically capable of doing it not only would not be doing it anyway but wouldn’t even think of it as part of their role. So you know – am I limited in what I can do because I’m a woman? Or am I limited in what I can do because I’m disabled? You know, there’s just so many things going on.

**David:** That’s really interesting. The impairment being some sort of inability to fulfil the expected role of woman, as opposed to.....

**Ju:** Well yes – it’s certainly something to consider. But I mean in terms of day-to-day problems, you know within a social model of disability, you know what we’re looking at is kind of independent control which I think links very heavily into ‘cyborg’ – nobody’s suggesting that an augmented human is a disabled human – although of course you might say that a disabled person is an augmented human – but that’s a whole kind of different issue. You know, because it’s about independence and control, and as long as I have control over how my life is run it doesn’t actually physically matter whether I’m doing it or I’m using technology to do it, or using another person to do it. So the sort of independent living model of the disability movement – you know – would say that somebody who uses a wheelchair all of the time, needs 24hr support, needs help to be fed, to undress, can still be a perfectly independent person, as long as they’ve got control – and the crucial question is control, you know adequately funded, and then being the person who says, you know – you’re the person I want to employ, this is what you do, this is how I want you to do it,

**David:** just buying services
Ju: Yeah, and I mean some of those services, are I guess, using people in the way that we use technology. I mean it's difficult to know what the difference is between cleaning by using a hoover, and getting someone else to be operating the hoover.

David: It's a role isn't it.

Ju: Yeah and I mean I think essentially, I mean – it's interesting, that in this country up until 50 years ago middle class people employed people –

David: to do the hoovering...

Ju: Yeah – and of course what's happening now is that disabled people are moving out of institutions and are having that level of service again, but 50 years ago it would be a status thing, to have somebody else doing your shopping and cleaning, and now it's not. So all of those things are just value judgements, effectively, you know – social barriers. So it is difficult to know where the kind of – I mean I think it's very clear to me that if I'm lying at home in pain and I'd rather be out – then that is a restriction. But I can't really separate that out from the fact that you know – I live in one of the ten richest countries in the world, I've got a reasonable standard of living, I've got access to all this technology. I can do a lot of things that somebody else who isn't in pain can't do, so where are you making the comparisons – it's then coming back to saying well – is there this sort of pure perfect human being, that everybody else is measured against? It's one of the major problems with –certainly Western – culture. I really don't know outside western culture, but 19th and 20th century Western Culture still harks back to – I don't know was it Plato's idea of this perfect human being? And you can understand in a world that kind of pre-dated anatomy and physiology and medical science, why you could believe that, but now we know that every human being is unique, and that nobody actually fits into this kind of pattern. But it's such a nonsense, that we still kind of have this belief in it. And like I said when you start breaking it down and saying okay well you know if you have the perfect body but nobody is perfect, how can you distinguish
between disabled and non-disabled? Because we’re all imperfect. I mean personally I think we’re all perfect, but...

**David:** And then of course you get into the problems of establishing oppositional identities, whether that’s gay & lesbian or disabled, where one accepts the label and then tries to turn it around as a force for opposition.

**Ju:** I think, I mean yes it’s difficult, because you’ve got, I mean I think it’s – I go through models of disability within my kind of thing in my hypothesis, sometimes my experiences as a disabled researcher, but, in an administrative model of disability you’ve got to accept a label in order to access services. So for example I’m sort of quote Registered Disabled, with Social Services, and that enables me to access free help. You know – I’m registered as needing a certain level of support and than enables me to access benefits – you know, parking concessions and so on and so forth. And in that sense, the label is, you know, yes it’s a stigma, it’s a negative label – I mean it shouldn’t be negative because it’s enabling you to access things, but they certainly frame it in a very negative way. Everything is concentrated on what you can’t do, as opposed to what you can. And it’s also, it’s supposed to be a stigma because it’s a way of kind of stopping people accessing funds unless they absolutely have to.

**David:** That’s right – so they can spend as little as possible

**Ju:** I mean it’s like using wheelchairs, I mean most people who use wheelchairs are like me they don’t use them full time, you know they use them to make life easier. But so many people for whom wheelchairs would be helpful don’t use them because of the stigma.

**David:** Yes the language thing about being ‘confined’ to a wheelchair.

**Ju:** Oh yes and there was something in the Guardian on Saturday about ? Thompson the way she was forced into a wheelchair at an early age, and you can
imagine her parents, (laughter) with a whip, you know like tennis parents 'Get to that wheelchair' because we want to see you as a wheelchair athlete by the age of 19. But I do find from a Cyborg point of view that's very interesting, because I think disabled people are so much envisaged as cyborgs with that wheelchair. You know, very very few people who use wheelchairs need them all – even within the home. And I mean they certainly don’t sleep in them, they certainly don’t have a bath in them – you know they might transfer from a wheelchair to a shower lift, but you know they’re not sitting in the wheelchair in the bath. And yet you know the descriptions and the language are very very sort of – you can’t distinguish between the person and the wheelchair. And a lot of disabled people who use wheelchairs get very angry at the way they will be described as ‘the wheelchair’. You know, it’s not just about talking to the person who’s accompanying them, they will actually, you know, be in a theatre or something and they’ll say ‘the wheelchair’s coming through’. – you know – not ‘the wheelchair user’ – and some of that is just appallingly bad language use and some of it you know disabled people actually being seen as inseparable from their technology; and of course it’s interesting because cyborgs are supposed to have high status, and yet in actuality as soon as you’re kind of seen as inseparable from your technology you’re given a low status. And that’s exactly the same for crutches, or you know even glasses.

David: Yes, it’s this thing about the ideal body again, isn’t it. If you can pass yourself off as the Ideal Body....?

Ju: I think we conspire to kind of keep these myths going, you know it’s like the sort of myth that science is infallible. You know we keep the myth of the Perfect Body don’t we, even though we’ve got a 150 yrs plus of science to tell us that that’s not true. For some reason we can bear to lose these ideas. And yet the strange thing is that they’re ideas that are very undermining to us, because none of us has the Perfect Body. You know we cling to this idea that then kind of puts us down. I don’t know why that is, it’s not my kind of field to research it but it’s something that’s always striking me kind of afresh.

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David: Right – if we have never been modern then the ideas of science are only one thing amongst many others to define who we are – these myths continue.

Ju: But science is self-propagating I mean I think it’s interesting the amount of research that’s now being done in terms of detecting the quote genetic abnormalities before birth and terminating pregnancies.

David: Right - very eugenic.

Ju: Well absolutely and it’s a huge issue in the disability rights movement at the moment. But what’s interesting is that they’ve already moved from trying to find cures for everything to trying to kill people because the only way we can maintain the link: Science being able to do everything is either to cure it and genuinely do everything, or kill the evidence. And I think one of the things that I find very interesting is that in a way it’s not even a resources issue, because at the same point that children are being killed before birth purely around impairment, there’s a whole new generation of disabled babies being created of kids who would have died had science not interfered. But that proves that science has got power over life. Whereas the birth of the other disabled kids, in the next cot has to be prevented because they’re absolute proof that science doesn’t have power over life. And so you have got scientists in the medical profession who are sort of first to try and keep these myths going. I mean I actually see Harold Shipman as being in a way not different from any other doctor – he’s just taking it to it’s natural extreme. That he can have the power over life and death, and play God. And I think all doctors do. You know whether it’s judgements about quality of life in terms of allocating treatment or whether it’s just in their daily work, and the only difference is that he’s (Shipman) used his own criteria. You know he’s rogue in that sense, but he’s no different in any other sense.

And again it’s a big issue in the disability movement the number of elderly people who are basically killed, because they’re in institutions and they’re sedated and they’re left without food or anything, You know which is a very different thing to those of us who...
sort of – I mean I might well myself leave a sort of living will that says I’ve had enough of the medical profession - I certainly don’t want to spend six months at the end of my life in a dreadful institution, but – on the other hand if you look at the sort of quality that can be offered within hospices and so on that’s actually unnecessary. But I mean you know the number of people who are left to just starve to death because they’re elderly is quite appalling – and it’s a very deliberate process you know in particular when you think that elderly people can get incredibly confused, you know they can deteriorate very quickly in an institution – so the judgements you’re making about them, in terms of their quality of life are already based on how they’re reacting to an institution, not how they’d be if they were getting better care.

David: You say on your website – you speak about the different social status of technological items in society, how a car, phone, or even contact lenses are seen as natural, and yet a wheelchair, stick or brace is something that is stigmatised in comparison. Can you tell me more about that?

Ju: I don’t know whether it’s this myth that certain things we can do without, you know we have fevers but we can do without them, whereas we use wheelchairs but we can’t do without them. But one of the things that I’ve really noticed is the changing social status of glasses for example, whereas I know when I was growing up I was very stigmatised for wearing glasses because I was practically the only child in the class, far more of that class in a sort of 21st century context would be wearing glasses now, because we’re much more aware of sight-testing amongst children, so I was less visually impaired than maybe five or six others in my class, and yet I was the most disabled by it. As I was growing up glasses started moving out of the National Health Service, and have now become fashion items, high status, etc etc. You know the stigma was purely attached to the kind of institutionalisation, state provision, and therefore the lack of aesthetics – you know the sort of freak thing around disability aids is that the designs involved are very poor. You know because I think something with no aesthetic value tends to be poorly designed full stop. Because they’re purchased by institutions. You
know wheelchair design is actually rapidly improving – simply because more and more people have to rely on private funding to purchase them. So you've then got the sort of economics come in, so all of a sudden you've got different weights, you've got different colours; you know you've got chairs that actually work much better as well as looking much better – and I think the sort of stigma attached to them in that sense is changing as well. One of the problems I think and one of the ways that disabled people do get reduced to their aids by the medicalisation is simply their appearance- you know that if you have a standard wheelchair –

**David:** You get standardised by it

**Ju:** Absolutely, you know if you've got 25 people and 25 different wheelchairs which these days does happen, it's very different to a sort of 1930s picture of everyone sitting there in something that looks exactly the same, and also happens to be incredibly ugly. It's very much that whole sort of post-modern approach you know that we assign value, you know there's no kind of 'given' – we assign a different value to having a Dyson to having a wheelchair. We assign a different value to having a bicycle, to having a wheelchair. Lots and lots of people use cars to go out and get their shopping.

**David:** But if it's a Shopmobility mobile wheelchair....

**Ju:** Yes, or you're using a scooter. That actually says more about your economic status. I've got an electric chair that I use far more because I don't have a car – and yet I'm viewed very different from somebody who can't walk that far and can't carry but drives to the shops. And yet in both cases we're using wheeled transport for a particular reason relating to our impairment. In the same way that a lot of people kind of never even walk to the cornershop – but the fact that they can, theoretically, you know it's like the kind of guy who theoretically could do his shopping and clean his bath, in actual fact never does, because he's a man and he has a wife who does it, is viewed differently to somebody who has that help because they can't do it.
David: So the social status of technological artefacts is actually indistinguishable from the social status of the person who uses them.

Ju: I think so and it's also used very much to define their social status – you know it's reflecting the social status but at the same point it's defining the social status. I mean I find it strange that all of a sudden microscooters are incredibly popular – and yet if the same people were sort of getting along in wheelchairs which in a way is no different it would be seen as very peculiar and very negative – it wouldn't be a status thing.

David: There'd be no kudos to it, right. You can imagine lots of 14-15yr olds going round in their snazzy new wheelchairs.

Ju: And yet in fact – because children take a while to get into those kind of social ideas – children are often first and foremost fascinated by wheelchairs as a kind of means of transport. You know you get kids absolutely kind of you know kind of desperate to have a go – to travel in it, to push it around. By the time they're 16 or 17 or quite often well before that they've got a different attitude.

David: They've learnt the social status of that apparatus.

Ju: But in terms of their attraction to it, they can get as much of a kick out of it as they do a bicycle. And I think that has to be true of cyborg technology.

David: Some of it will be sexy, some of it won't.

Ju: Well I think that's already happening really isn't it. The crucial difference between what I would call cyborg technology and tools is the things like you can use the internet you can share – you know it's the sharing of minds isn't it – in a way that you can't do with print, and you can't do with the telephone. And the sort of augmentation of things like computing power – I mean the calculator is cyborg technology the mobile phone is cyborg technology, the personal organiser is cyborg technology. But again if I
use a personal organiser to augment my brain and that it’s sort of quote quite normal to start with – then that’s fine. If I’m a disable person who’s got a neurological impairment and can lose my memory –

**David:** - using a personal organiser –

**Ju:** - is low status, particularly if they’re then using something that is essentially a personal organiser but has been produced by the NHS because they can’t remember things.

**David:** Sending SMS text messages from mobile to mobile is cool, using a minicom to communicate over the phone because you’re deaf –

**Ju:** - isn’t. Again that’s why it comes down to the social model of disability, because you know are you actually impaired because you use text in a world which depends so much on email and text messages. You know that you sure as hell are disabled.

**David:** So on another note, entirely, I saw you late night on C4

**Ju:** Oh did you – Inner Space (laughter)

**David:** Yes. That programme – it was marvellous to see you there – what was it a couple of months ago –

**Ju:** It’s amazing actually I thought nobody would see it, and I even got into it – coz I work part time for London Action on Disability and I go into the office and as soon as I go into the office the receptionist is going 'Digital Sex'!!!

(laughter)
David: Well I just saw – er Cyborg programme – oh I better stay up and watch that and there you were, and you were the most interesting thing on it, erm, but what was fascinating, something I hadn’t really gathered from the hyperthesis at all was this whole orthopaedic fetishist thing.

Ju: Yeah I mean I think all of that’s really covered in the My Not-So-Secret Life as a Cyborg site – there’s an analysis of it – there’s a section called audience reactions

David: oh yes I read those –

Ju: and I’ve got some quotes from some of the fetishists’ comments. Yeah it was actually meagre issue at the time of the interview and it was then seized upon with great relish – partly because I was sitting there trying to do – the sort of things that I’ve said to you earlier and my big kind of doubts about things like implants and stuff – you know if you can’t do an organ transplant without being on steroids all your life and you can’t put a spinal rod in or a hip joint that’s gonna last more than five years then I’m very very sceptical to say the least about the kind of discourse around that kind of technology and of course what they were doing is interviewing a lot of people who were saying exactly that so even though I knew the programme makers thought it was rubbish – and anything I was saying that was remotely critical was still removed because you know it’s not good TV – they’re actually kind of following this flight of fantasy even though they’re sending it up.

David: So they did kind of blow it out of proportion really. Not surprising.

Ju: Well they did and they didn’t – it comes back to this sort of value thing. What I find very interesting about orthopaedic fetishists, or – I must admit they don’t tend to write to me any more because they know that their words could be quoted albeit anonymously – which has had the kind of I have to say desirable effect, in cutting down the that level of correspondence – but what’s so interesting about it is it shows me that the brace has got no meaning in itself – you know – in the same way that we were
saying about other technology it's kind of attached social value – because the attached
social value of the fetishists to the back brace is that it's incredibly desirable it's incredibly
attractive – not just desirable and attractive in the sense of somebody else wearing it but
desirable and attractive for them to wear themselves. And I was invited to go on to the
Back Brace Fetishists website – which is a massive website – and there's some short
fiction on it and there's a story about somebody going to see their doctor and being told
that they had to have a back brace, and getting fitted with it and walking out – and it
was very similar to the description that I'd done of going to do the doctor being told I
needed a brace, being put into plaster, walking out – except that mine was all about kind
of – you know – loss of control, horror, feeling confined, and this story was pure porn –
you know it was incredibly erotic. I realised that what I was writing about as a very sort
of negative experience was being written about by fetishists as an intensely desirable
experience, and the sort of sexiest thing that could ever happen to them. And the thing
that would make them feel the most good about their own body. So again it kind of just
totally underlined for me that there was no innate value in what I was actually doing,
what I was wearing. It's not just social value in that it's also perception. For me the
brace is restricting but it's also liberating – you know I can do less in it in terms of
physical movement by I can do more in it in terms of I can keep going a lot longer. I
often wear the brace full time at a conference because I know that that's the one way
that I can get through three days without significant back pain.

David: I remember you wore it at Aberystwyth.

Ju: You know but at the same point it's then affecting my ability to turn or to sit
comfortably on different kinds of seating, and all that kind of stuff. On the other hand if
I was getting off on it then none of those things would be an issue. And in any case our
physical movement is very limited by clothing and all sorts of things – think of women
who all of the time wear high heels and skirts and the limits that are there and yet
they're completely acceptable limits – people don't think of them as limits. But that's the
most interesting thing about the fetishists – you know just a completely different value, completely different perception.

David: So life as a cyborg, for you, is one of many identities that you perform rather than something that’s defining of yourself?

Ju: I don’t know that it’s one of many, I mean in a sense – I do very deliberately within the cyborg identity incorporate sexuality and androgyny – it’s not just about disability – although of course those things then come back on you because, for example disabled people are not supposed to be sexual, or if they are they viewed as VERY sexual, which again is the perfect cyborg analogy – cyborgs are either very sexy or asexual, androgynous. You know in the same way that they’re not quite deserving of human rights, and maybe dangerous – I think I go through all these things somewhere on the cyborg site. It’s not just a disabled identity I’d probably say that does incorporate my identity as a lesbian woman. Give me the question again.

David: Being Ju90 is something that you present as a performed identity perhaps?

Ju: I think it’s a consciously performed identity – I think there’s an argument about whether we’re all performing identity. I think probably the key difference is that it’s conscious. And it’s conscious because it needs to be, it’s a way of taking back control. What I’m doing is playing with the look, and if as a disabled woman and indeed as a lesbian, people are gonna assume they’ve got the right to stare, then I’m actually going to control that stare to the extent to which I can. You know, I’m not necessarily going to present them with what they expect to see. And of course that sort of classification look I think, whether it’s around sexuality or disability is very often the sort of precursor to looking away. You know – you kind of dismiss somebody – you assign them negative attributes, and dismiss them. What I tend to do is try and play with the look and force - you know – it does actually produce very strong reactions but generally means looking again.
David: Is it something that you wear to go out on a regular basis, or just from
time to time?

Ju: It very much depends. I've actually – nothing to do with the impairment –
I've actually been seriously ill for the last eight months, so I've hardly been out at all.
And because that's a process that hasn't finished I haven't started writing about it yet –
no doubt I will do. So I can't actually say, and at the same point what I have managed to
do in the last twelve months is acquire both a manual wheelchair and a power
wheelchair, whereas I didn't have the sort of economic status to do that before. It's
impossible to get an outside power wheelchair through the NHS. What I've now got is
one supplied through the Job Centre, and once I realised how useful that was I've now
got a manual wheelchair, through the NHS so that for example I can go to something like
an exhibition and I'm not constantly worrying about the pain because what I find is that
if I'm standing for long periods – that's as difficult as sitting for long periods, and if you're
going to something where you have to sit for long periods, then it really restricts my
mobility in terms of walking. So therefore being in the chair gives me a sort of
comfortable option but it also means that if I'm having to sit, for example at a
conference, which means it's going to be more difficult than usual to walk I won't have to
do that at all because I know I'm going to get tired if I'm going to be at an event where
I'm standing a lot. If I can transport it there, which is of course the other issue – living
in London you've also got the issue of distances that the wheelchair can't travel so you've
then got to work out how to transport the wheelchair. I think that whole kind of identity
as a wheelchair user is going to be the next thing. So I think less and less I attach that
identity to the brace and more and more I think of it as whether I'm just using the stick,
or whether I'm using the brace or increasingly using the wheelchair. I would say that to
some extent I'm always consciously performing my identity, but I do think we're all
performing our identities, you know whether it's the sort of woman in the high heels and
lipstick, or the woman who says no I'm not wearing high heels and lipstick, I'm wearing
Doctor Martens and no make-up. Or the guy in the suit – I mean it's impossible for what
we wear and how we present ourselves not to be part of that identity in the same way that it is a performance. I think somebody going off to the city in a bowler hat is very much performing an identity, and in the same way somebody going to work in a sort of software company where the regulation is jeans and casual shirt is very much the same. I think men’s performed identities is a much narrower range. And I almost think it’s more important to them. There’s a piece within My Not-So-Secret-Life as a Cyborg named Pride where I say it’s unusual in a way that white heterosexual non-disabled men seem to be the ones who are obsessed with labelling everybody else, and yet if you look at their very narrow choice of clothing and lifestyle you can see why, because they are the group who are obsessed with it. The people who are supposedly concerned most with identity, lesbians, gay men and disabled people and black people are actually people who in a way are the least concerned – but have to be concerned, we have to have this identity because it’s put onto us. And we then have to take control of it, and make it into something powerful. But I don’t think as groups we’re people who would necessarily be that concerned. We’re defined by the sort of white heterosexual non-disabled men’s obsession with these things. And I guess because you define everybody else as other, then you have to keep shoring up your non-otherness.

David: Do you think white heterosexual men, growing up in a white heterosexual male world, are as much a victim of this as the rest of us or do you think they getting the best end of the stick.

Ju: It’s difficult to see people as victims when they have the power and they have the control. I think you can only really become a victim if you’re challenging it. I do think it’s very difficult for white heterosexual non-disabled men to challenge the rest of the group. But I think unless you’re challenging it I can’t really see those people as victims. And like I say I do see them as being the most obsessed with performing identity. And of course white heterosexual non-disabled men do run this society, there’s no doubt about it. If you lived in the academy, I mean even the gender imbalance I find staggering. When you think of how many years equal numbers of men and women have
been through university doors there's no other explanation for the sort of enormous imbalance in terms of – not just teaching staff but who those teaching staff are and where they are. Once you get into senior lecturers I think something like 25% are women, or even less. So I mean really it doesn't matter where you look, that group is in charge and that group is the group that's sort of propagating ideas around, in a way the Perfect Body which is male, it is heterosexual, it is non-disabled, and it is white.

David: Which is a good note to leave it on, I think. Thankyou.
ii. Professor Richard Norman

Interview with Richard Norman, in his office at University of Utah, Salt Lake City, March 2000.

Prof. Norman: In graduate years - I was really interested in neuro-prosthetics, at the time. I was slightly interested in the cyborg sort of revolution - and er what was going to happen, as I was interested in robotics as a kid, and the whole concept of trying to rehabilitate people - what would be the degree of rehabilitation that was possible - seemed like the wrong way to go to me. I mean the idea of implanting systems in people to make them more mobile (paraplegics, tetraplegics) - it seemed like it was not going to be necessarily the best way to go. A more fruitful way to go - this could be something that could be down your line - would be not to instrument the body, so the body can move through space, but to instrument the 'id' that move its way through the world and interact with the outside world, and the tetraplegic could remain in bed, and interact through this sort of extension of himself..

David: A kind of telepresence

Prof. Norman: Something like that. And when I talked about that to a variety of friends and colleagues and everything over the years, people are generally horrified at the idea. And if they're horrified it's because they don't believe that people can - their identity can be this remote system which is sort of driving around, and they think that the body is an important part of interaction and whatever. And I'm not sure that's the case. I think that people are very good at sort of virtual bodies - when you talk to this thing [holds phone up in the air] and you have the sense that you're talking to a person, you watch television and have a sense that you're looking at a person, and so on and so forth. So I think that, while this is an unpopular idea, I think it's only - it was a knee-jerk unpopularity and it was not a rational unpopularity, or a well-founded unpopularity. So - and I haven't done anything more with that, I just thought that that might be a better
way to go. It would be easier to make little, small robots to interact with the world than.... Now getting tetraplegics more mobile also has a positive side effect as well too - there's of course psychologically positive side-effect that they're a more capable functioning human being which would be very psychologically satisfying to these individuals. Like, there are problems with bedsores and things like that, and this is a real serious problem - and degeneration of bone mass and degeneration of muscle-mass and everything kind of falls apart when you don't move. So getting these people to move would be a more positive thing, but back 25 years ago, people fantasised about exoskeletal systems that could be put around a tetraplegic sort of to make them be able to walk and move in the world - and this was just so incredibly cumbersome and energy inefficient. You have - I mean - it just didn't seem like a good idea. Now - over the last 25 years I think we've made a little more progress. And so - well we're still a long ways from making tetraplegics walk and interact with the world. It's possibly becoming more possible than it was 25 years ago. It amazes me the things we've been able to do. But still a long ways away. Who have you interacted with so far in your quest for knowledge in this area.

David: Well, interestingly enough, last week, I attended a conference in Washington DC on Exoskeletons for Human Performance Augmentation.

Prof. Norman: (laughter) Who was the sponsoring organisation?

David: DARPA

Prof. Norman: DARPA?

David: Yeah. So it's Govt money. And it's a military project.

Prof. Norman: Right.
David: Which kind of fascinated me.

Prof. Norman: The concept there was to use these in battlefield situations?

David: Absolutely. The morning sessions were various representatives of the marine corps, naval, sof, and there was one buyer - Dr. Garcia of DARPA, and erm, so for me the morning sessions were very interesting, including the address from Dr. Garcia - it was a very intriguing few days, and it kind of realigned some of my ideas - I had questions typed for you and I've re-written them completely.

Prof. Norman: So you have probably some very good ideas - you've a better idea - about the state of this technology than I do, coz I've not followed it. The exoskeletal technology.

David: It's very interesting - California Institute of Technology are using your array in some of their work and they were presenting that work in Washington

Prof. Norman: Richard Anderson?

David: I'm not sure of the name - I could check up

Prof. Norman: It's probably Richard Anderson

David: Perhaps I should launch into [holding up question sheets]

Prof. Norman: Yeah sure - you have very specific issues?

David: Yeah, they're quite broad questions really, but they sort of cover two or three chapters of my PhD - and obviously some of them are quite pithy subjects so ....

One of the things I'm looking at - trying to get a handle on, certain attitudes to, triangulate in a way, I'm comparing, juxtaposing er, Holistic approaches to the body.
There are many practices, involving the body, both the remedial – including reflexologists, osteopaths, chiropractors, Chinese herbalists and acupuncturists, and so on - and the enhancing - including the many and varied martial arts from the far east, yogic techniques, and so on - which share a common understanding of the human body as an integrated and holistic whole. What’s your angle on that side of things, how do you?

Prof. Norman: Well I suspect that my take on that is the take of every body’s which is that through practice - ‘practice makes perfect’, and all of our skills can be honed by practice and this holistic approach - martial arts - is true, you do enhance, your reflexes can be increased a little bit, you can do things you couldn't do before through repetitive behaviour and things like that, so I’m completely supportive of that. Using our kind of technologies, neuro-prosthetic technologies - maybe this is a question you have later on - but trying to use neuro-prosthetics not as a rehab technology but as a performance augmentating technology I think is naïve and silly. There was a guy at the NIH - Terry Hambrecht - who was in charge of the neuro-prosthesis program there, and Terry actually believed that we could do better than we do, by implanting systems into the nervous system. I don't believe that. I think that the best that we’re going to be able to do is to take people who can't do anything and make them perform at a very low level - but better than they could do before. And the sort of 6million dollar Man sort of fantasy is what er Terry Hambrecht had in his head - and he's a bright guy, I'm not denigrating his intellect, but I just can't quite see that.

David: Ok. So getting into the, perhaps, philosophical question of it, erm, one of the things that intrigues me about the medical model is, obviously, enhancement through yogic techniques doesn't add to or replace internal organs with technological devices. And looked at from the holistic perspective you get this notion of ‘Chi’

Prof. Norman: If there is such a thing -

David: If there is such a thing - what is your take on that, how would you
Prof. Norman: Well I'm not strong believer - I'm not an advocate at all of 'Chi'. I believe that we're deterministic, and er, we just don't know what the plan is, but we are deterministic. I don't believe that we have a soul. Now we're getting into religious issues here, but, yeah, and because we're deterministic I think this notion of Chi is just another euphemism for the interaction of things that make up your life force of sorts. But I believe it's a physiological issue. The brain and the neuro-chemistry associated with mood, influence things dramatically, but I don't think there's anything particularly magical about the body.

David: OK so here's the punch line.

Prof. Norman: (laughter)

David: Now, I actually share with you the medical model with regard to the body, but I've got this intriguing problem here with taking this holistic thing at different scales. At the scale of individual bodies, in our hospitals and universities and so on, the medical model holds sway, and I think that's right. At larger scales, however, incorporating whole environments, the holistic model of ecosystems is held to be an accurate picture, with Mandelbrot patterns reproduced at all levels of the integrated animal-vegetable-mineral-atmospheric Gaian whole. So this picture holds enough scientific weight to have caused major policy changes in the industrialised nations to protect the health of this holistic planetary ecosystem - much to the chagrin of some corporations for whom the compartmentalised, modular model of the environment allows easier and cheaper disposal of waste, for example. So we've got a disjunction here, between our conceptualisation at different scales. Now is that just an example of post-modern pragmatism, fitting the right model to the right thing, or is there potentially perhaps in your opinion some future problem that might arise from this disjunction?

Prof. Norman: Well I think that - I don't know, I don't think about these things too much - and I don't think that the term you're thinking of - I don't think of our view of trying to help our global picture (- and we're not helping it very effectively -) but our
attempts at that, as being a holistic approach. I wouldn't call it a holistic approach. I'd call it a sort of a 'stumble fumble' sort of approach; we're kind of trying to fix up wherever we discover there are problems. We're trying to stop rainforest deforestation, things like that. Trying to feed the masses - not necessarily the right thing to do - but trying to do those sorts of things. I don't see those as being holistic approaches. Those are approaches where we recognise a problem - we've identified a problem and we're trying to solve the problem. That's not a holistic approach, I don't think.

David: No, it's not so much the approach as the reasoning behind it. Lovelock's...

Prof. Norman: Well I'm not sure that society embraces that holistic view of the world, or science embraces that holistic view of the world. Perhaps you embrace it, but I'm not sure if science embraces it, and I'm not an expert to talk on that subject I don't know anything about it this is only personal opinion. So I don't know and I'm not informed in this area at all. It's clear that we do view the world as an integrated whole, and that fiddling with this thing has consequences over here, you know we understand the interaction much greater and much better than we understood it before, but we still don't understand it hardly at all. Have you ever seen any of the input/outputs maps of the United States economy?

David: No

Prof. Norman: It's a huge, gigantic map - looks like a billboard, and it tries to sort of relate interactions between different segments of the economy. I guess some economists did this 25 or 30 years ago or something. And if the railroad system does something screwy over here it influences cosmetics over here somehow because of some very complicated system. And this is just the economy in one country - you talk about the world economy and the world population dynamics, you talk about the ecology as a whole, it becomes a very intractable problem.
David: And yet economics still claims to be a very exact science...

Prof. Norman: (laughter) Well I don't share that view either! So nobody would I think argue about the interaction of these different parts of the world population, the world system, but to describe it as a holistic - may be it's just my problem with the holistic definition of all this - the holistic view, I mean it sounded as those your proposing that everybody's embracing this as a holistic sort of thing and trying to approach it as a sort of alternative, trying to relate it to the kind of alternative way of approaching the body..

David: I'm not suggesting anything really - it's a kind of intellectual conceit to play with, in a sense. Because it intrigues me that there may be - maybe not in exact terms - but some kind of disjunction here we may come up against in the future. I just wanted to gauge your opinion on it.

Prof. Norman: Well, let's talk about the body first, before we go to the whole world. It's amazing - I've known some strong advocates of the whole holistic approach, an alternative medicine approach to the body. To be perfectly candid these people have had an - the one's I've interacted with - have had a phenomenally ignorant view of the human body, and this whole concept of cause and effect, has - and these are scientists, people with PhDs, trained people - that's been sort of thrown out the window, and they've substituted sort of classical cause and effect for sort of FouFou cause and effect. I do believe that chiropracty has value - I've seen, I've personally not had a problem with my back, but my father has, and my brother has, and so I've seen these people go to chiropractors, and get adjusted, and whether the chiropractor is - what he's doing is not clear to me, I've never been to a chiropractor, but it clearly has been very effective in their cases. So that seems to help. Acupuncture? There's evidence that it does seem to help, but the evidence there perhaps is more subjective than objective. Well it's more subjective - in fact how much it really involves endorphins, naturally induced endorphins
because of the psychological states that you get into when you're going in to see the acupuncturist, and I don't know. It could be self-medication due to endorphin release and things like that. So the advantage of classical medical therapies is that they are based more soundly on cause and effect. You can actually observe - and that's what we try to do in medicine today, we try to do Rational Medicine. Specifically - this is a very expensive (in terms of human health care) process - but they're gonna decide that this is the best way to do a particular procedure. And they'll design a protocol which they're going to test, and then they will use this protocol for six months, and they'll look at the outcomes - it's an outcome analysis. What are the consequences of this particular protocol? And then they will - once they have the outcomes established, and all the surgeons who are in this trial use this protocol, then they go and they decide what is probably the most beneficial change that we could make - so rather than each physician independently deciding himself, autonomously, 'Gad it seems to me I should try this thing rather than this thing', here they talk it over they decide things rationally, they change the protocol, they do another six months with the new protocol, and look at the outcomes of that. And even if it looks worse, they still go through that protocol, to determine that in fact, that was not a good way to go. So you could argue, on individuals that are being treated with these different sort of protocols, some of them could get poor health care. It's a placebo sort of thing. They're treating the whole healthcare delivery process as a placebo kind of situation and trying to optimise the process, and the results of this have been very encouraging - they've made real progress in delivering more rational health care than they've been able to do in the past. So this approach can be studied. That's the difference between this approach and holistic approach. Are you familiar with the concept of X-ing? No. This is also an oriental technique, and it has to do with Chi as well. I'm not a proponent of X-ing. This is a guy over in Physiology department, a professor in Physiology who experienced this personally, and became a very strong advocate of this thing called X-ing. And he was a real strong believer, and because he was such a strong believer he tried to apply the scientific technique to study the process, and whenever he tried to apply scientific tools
to the measurement of this thing, the thing evaporated, there was nothing there. And so - you have two conclusions - one conclusion is that this whole thing is FouFou, or the other conclusion is that the thing is real but the process of measurement makes it disappear, scares it away and it doesn't exist anymore. And interestingly, even though this guy was trained and is a scientist and has been one for decades, his belief - he's such a strong believer in this - he's experienced this thing himself. He basically believes that it's real - you try to measure it and it's the Uncertainty Principle, and it goes away. That's freaky. And so that's the problem with the holistic approach I think, it's that it doesn't lend itself to the scientific method, and traditional approaches do. Now I'm not embracing completely all the traditional approaches. But if I had a problem I tried to understand what the physician has in mind, in terms of diagnosing my problem, I'd try to understand this is probably a rational way to go, and I'd probably adopt his therapeutic approach, as opposed to going to a holistic person where the whole thing is based on sort of more psychological issues, rather than physical issues, and where I can't really get my hands on Chi, and energy fields. So that's my philosophy there. So not a strong advocate of the holistic approach. OK so now we go to the whole planetary system. The problem of trying to do things. Erm maybe it's the best way to proceed would be for you to give me an example of a holistic position as opposed to a more classical, mainstream science position, with respect to the whole ecosystem.

David: It's difficult because it's a mainstream science example that I would use, though, well I'm not sure how mainstream it is -

Prof. Norman: How 'bout the ozone hole

David: - yeah the Chaos theory thing

Prof. Norman: Well how 'bout - let's talk about the Ozone hole. People have been sort of suggesting for long time that there's a - and - holistic people - before there was any real evidence - just believed that what we're doing has to be fucking things up. That's the premise, that we can't be doing good things, that whatever we're doing,
because we're not thinking about it, we don't understand it well enough, we're fucking things up. And so, if you have a negative take on what we're doing to the environment, you look at something like the ozone hole, and if there's a hint that there's something there, you will embrace it and say well here's evidence of how we're trashing things. Now you put the scientific method on that, and try to measure the ozone hole try to figure out what's going on in the ozone hole you can't really measure it. I mean, it looks like - I mean - I believe in the ozone hole and I believe it's caused by our production of excess CO2 and things like that, hydrocarbons, I believe that. But rather than just embracing it - because we have to be doing bad things to our society, I'd rather try to measure things and try to understand what's going on from a more rational point of view. Now the downside of that is it takes longer to have that understanding, so if your initial knee-jerk response - the holistic response - is that whatever we're doing we're doing it wrong, and we've gotta change things, you can reset things faster, if that's your model, than the scientific method, where it takes you 20 years or 30 years to come to the conclusion that the knee-jerk guy came to originally. In which case you've done 20 or 30 years worth more damage. So there are consequences to the scientific method - it takes time - when you're trying to monitor things at such a global scale, it takes decades, you can't do it in days weeks, or months, it takes a long time.

**David:** OK, so let's leave all that holistic stuff behind, that's very interesting. What's particularly interesting from this is this Heisenberg Uncertainty Principle idea - that it just chases it away when you look at it, with the scientific method.

**Prof. Norman:** As you don't know anything about X-ing let me just quickly tell you about X-ing. This fella came back from the Orient, where he experienced this. The way it works - I can't do it or explain it right because I don't know much about it - but basically the way it works is it interferes with energy fields, Chi-fields, and the way you do it is you literally do this to a person [draws an X across my torso, at a distance of about 9 inches, with one hand, fingers outstretched, palm flat.] And this is the X that is done, and somehow that destroys your Chi, and we can demonstrate this with some
simple sort of tests. One of the tests that used is you would have your hands out like this [palms pressed together pointing outwards in front of oneself] and I put my hands in here [between the forearms] and normally I can't push your hands away. And then I X you and then I can just push your hands away with no problem at all. So, supposedly it's that dramatic. And, this person had experienced this from this point of view, and he felt that he was as strong as he was before but it was clear that he just lost strength. Now it's quite possible that the process of doing this [the X] has pumped up the person who's pushing the arms away and you know he's playing the game as well too. Anyway so this person tried to measure the amount of force that can produce before X-ing and after X-ing and all this kind of stuff, using force transducers and as much instrumentation as he could do, and of course he couldn't measure anything.

David: It's probably largely psychological.

Prof. Norman: Well that's the whole point, it's psychological in two parts. If you believe in X-ing, and I believe in X-ing and I X you, then I've increased my power, and you, in your part, because you believe in X-ing, will feel that your power has been decreased. And sure enough it seems to hold sway.

David: So it's actually, from a sociological point of view, it's a social reality rather than a physical reality.

Prof. Norman: Yeah, that's right, yeah. Right - but you could argue it's a reality none-the-less.

David: Absolutely.

OK, erm, duality. The duality of mind and body.

Prof. Norman: I believe that the mind is deterministic, it's just we haven't figured out how to do it yet. And erm, so I believe that the mind's gonna be no more mystical or different than the body is, just works with different sort of cells. Different
circuitry. I'm not sure we'll ever be able to understand the mind, because of it's complexity, but I do believe that in fact the brain is just another organ like the liver or the heart the lungs.

**David:** And the personality is defined by that.

**Prof. Norman:** Yeah of course. It's complicated system. My MacIntosh computer or PC Computer seems to have a personality of its own when it gets into sort bizarre states. You get a system with sufficient complexity it can manifest rather interesting behaviour - and in fact this is very interesting and maybe you've thought a bit about this as well, is you can, I can - I can't, - other people have written programs that cause 'bugs' to move across the computer screen, and interact with other 'bugs'

**David:** Oh yes I've heard of this, artificial life on screen.

**Prof. Norman:** Yeah right. And these bugs manifest incredibly sophisticated behaviour. And you think wow. The algorithms that must be causing this to happen have got to be incredibly complicated, and in fact they're incredibly simple just like two or three rules which are required

**David:** Like the Chaos theory thing

**Prof. Norman:** That's right, very simple rules, make what seem to be extremely sophisticated behaviours. So in fact the behaviours that we manifest ... erm...

**David:** May indeed boil down to very simple equations.

**Prof. Norman:** Well not equations, but very simple sort of, you know, connections. What amazes me is erm, we used to believe that we were special - you know, Humans are special, a unique form of animal life. Now I think that belief has fallen by the wayside. Quite properly. I don't believe we're special. I believe that we do have some unique features, we have hands and our language which makes us unique,
but what amazes me is the capacity for lower life forms to manifest an incredible range of behaviours that's almost as rich as ours. You take a cat - a cat has a brain the size of a walnut, yet that cat manifests rage, anger, affection, curiosity, play, erm, communication - all the sort of basic emotions that we experience. It just can't articulate them very effectively. But they're there. So, you know, our brain is probably 30-40 times the size of a cat's brain, but we're not much different. So I don't believe that we're something special, I think that the brain is just another organ.

David: OK, staying with philosophical and social things with respect to. Okay, first thought. Personal responsibility, in legal and ethical terms, is predicated on the basis of the control over the self-as-a-body exercised by the self-as-a-moral-intelligence. This is a kind of dualistic mind / body set-up, but its kind of what we understand in today's culture as defining humanity, and it's enshrined in the fundamental structures of our society. Work ongoing at CalTech that I mentioned earlier, showcased at the Exoskeleton conference. They're using the Utah electrode array to derive accurate directional and volitional data from the areas of monkeys brains where intent is formed prior to the related processes in the motor cortex, and they have achieved some success with monkeys. Although DARPA director Dr Garcia was clear that invasive surgery for soldiers was not on the agenda, some neuro-mechanical response system, based on this research, which no longer required invasive surgery but enabled soldiers to fire their weapons by wanting to, would certainly them the edge, which is something he was quite keen on. In the longer term, such technology could grant the self-as-a-moral-intelligence, control over a body no longer delimited by the skin, as you said on your website, moving wheelchairs and so forth. Now a self-body incorporating new organs of varied function and complexity. What intrigues me is that when the skin no longer demarcates the limit of the self, what effect will this have socially, on the notion of personal responsibility - as in, e.g. it wasn't me officer it was a bug in the software. I suppose there's a kind of part of my research here that's a kind of risk analysis, let's think about these things before the problem arises.
Prof. Norman: Right. Well that is a problem actually. I have thought a little bit about that. Let's talk about controlling the wheelchair. Are you familiar with the work we've done in collaboration with John Donahue at Brown University. OK. We've implanted one of our electrode arrays in the motor cortex of a primate. The primate plays video games. The video game is a very simple video game. A spot comes up on the screen, and he has to put the cursor over the spot and then one of eight radial positions lights up and he has move the joy stick and put the cursor over the spot that's lit up. And if he can do that in a second he gets a reward. And the primate can do this very well. And we've had our electrode arrays implanted in a primate for over 3 years playing this game. And we look at the firing pattern of the neurons in the motor cortex - and we look at the firing patterns and we use those firing patterns to determine where he's moving his hand. So to start with of course we have no idea, but you can train a neural network - each time he moves to the right, you say, look at the firing pattern, this means move to the right, each time it moves up, look at the firing pattern, this means move up, and you can train a neural network to figure out the patterns that are in the firing... firing patterns, and you can use that to estimate where he's going to move. And you can estimate where he's going to move to within 80-90% correct. You still can't do it 100% correct. But this is with only 16 electrodes. So the question is - how many electrodes would be required to reliably control a wheelchair. Now the thing that controls - so you could sort of say, if he's already doing this at 80 or 90% correct, we're going to miss interpreting which way he wants to move 20% / 10% of the time, and if we're controlling a wheelchair, 10% of the time this guy's gonna want to turn right and he's gonna go faster straight ahead and smash into a car. Not a good idea. Right. But, the thing that's causing the cursor to move on the screen, is not the firing pattern of the neurons. It is the joystick. So if we could actually get the monkey to move the cursor on the screen based on the firing patterns of his neurons here, he might think that this is what's doing it but he'll start to make subtle motions which will allow this to probably happen 100% correct - might - so this notion of responsibility - in terms of MY responsibility, if I implant some electrodes into a person who's wheelchair bound and he's
going to use these controls to control an external device - what is MY responsibility in this
going to be? What happens when the system fails? Look when you drive a car, what
happens when your wheel falls off and you kill other people, it's your responsibility the
wheel fell off.

**David:** Because you're in control of the car.

**Prof. Norman:** Yeah - you're supposed to be driving slow enough so you can
actually control the car but in fact nobody does. At Freeway speeds if your wheel falls off
you'll kill people. And you'll be killed probably too. So we just assume. The wheel can
always fall off - there is a finite amount of risk associated with it so you just try to
minimise that as much as you can. So before these systems are implanted in human
volunteers, you don't allow them to get into situations where significant damage could
happen to them and to others. As the systems become more and more and more
proficient, I mean - the Wright brothers' flyer was not a very good thing to put twenty
passengers on, to start with, but with evolution, better systems evolved. And that will
certainly happen with these kinds of systems that we're working with. But that's not the
question you're talking about. You're talking about I think a more sinister view of
responsibility. You're talking about a more instrumented individual than what I'm talking
about. How much instrumentation are you talking about? I mean if you can give me a
specific.

**David:** Well because of the Exoskeletons conference I went to the vision I
gained from that, looking at the ways in which these technologies are being applied by
military, they were after some kind of external neuro-mechanical response system that
didn't include invasive surgery, but could be worn - in a helmet, which you could then
plug into all sorts of things, and move around - at that point, the self-as-a-body includes
mechanical organs.

**Prof. Norman:** Let's not make that step, because in fact it's not clear how
simple that's going to be. In fact, intellectually you can make that leap, with facility.
that might be technically a very difficult leap to make. I mean the amount of control that you might be able to do with external systems is very minimal, and so let's not think about that, let's think about the legitimacy of implanting arrays. Now I'm not endorsing this. But let's just.... Then you start getting many more degrees of control. You can put a whole bunch of electrode arrays in the motor parts of the brain, you can put a whole bunch of electrode arrays in the sensory parts of the brain, so in fact, instead of using your eyes you could use tv cameras to get information or you could use rotating satellites in orbit to give you information which you could directly visualise. And you could - you could - I'm not advocating this. And then you could implement things, rather than having to sort of move your hands to do things you could just think volitional thoughts with sufficient training and you could sort of pull triggers or you could do whatever you wished to do, just through volitional thought. I don't see that as being a significantly different situation, I mean your element of personal responsibility is still the same, I mean, you have licence whether you in fact, - there's a firing pattern in my brain that causes my finger to do that [bends finger]. And it's not God's will that causes me to do that it's a firing pattern in my brain. I think I have personal responsibility to pull the trigger on a gun and shoot somebody. Whether I in fact physically pull that trigger, because of this connection between the motor part of my brain to my muscles, or whether in fact I've got an external system which allows me to do that, I still have that responsibility... I think I could - right now - create a system that could shoot you - just through my verbal command, I could say 'OK shoot him!' And it would shoot you. Er - I still have the responsibility cause I built that system, and I told it to shoot you.

David: So in terms of the social contract of legal and ethical personal responsibility you would have to be able to measure these volitional firing patterns somehow to prove the case...

Prof. Norman: Oh yes and your argument that there was a bug in the software is legitimate. That argument is used today as a matter of fact. I mean - the bug in the software is schizophrenia, or ratolin or a variety of psychotropic drugs that are being
taken now. There's a psychotropic drug, can't think of the name of it, which in 95% of people calms them down, and these are people who are kind of, you know, psychopathic, and it calms them down, but in 5% of people, or actually maybe even less maybe 2% it actually causes them to become even more hostile and aggressive and a number of people have actually - there are murders that have been committed by people on this particular drug. And now the claim is - 'the drug made me do it.' And so I think the issue you're talking about is already here. It's been here for a long time. I mean what is responsibility, a person who is 'criminally insane' doesn't go through the same legal system as person who is a murderer goes through.

David: It's already a bug in the system.

Prof. Norman: That's right, exactly. So I don't see significant differences there. I still think people are personally responsible.

David: Oh yeah. On the Bionic Technologies website, there's mention of the capability of electrical stimulation of the sensory cortex.

Prof. Norman: That's the whole notion of artificial vision and artificial hearing and whatever.

David: One of the ideas that came from that was could this take, say, electronic tagging to its ultimate extreme, controlling behaviour in the criminally insane, or the politically undesirable. A kind of electronic soma.

Prof. Norman: People already see what they wanna see. TV commercials tell us - make us see things that we want to start seeing, wanting to start buying and things like that, so I mean already there are systems in place which can rather dramatically alter our behaviour.

David: Sure. So this is an extension of what's already here.
Prof. Norman: Yeah.

David: But I wonder if the intimacy and complexity of things takes it onto a new level. What I'm angling at, I think, is questions of identity. At the moment we can choose to switch the TV off.

Prof. Norman: And you can choose to switch your input into your sensory systems off as well, too.

David: Will we always be able to do that?

Prof. Norman: Well if you're blind - well you always can. I mean - you will be in control, of whatever. It sounds like I'm advocating for a very much of a Brave New World sort of - I'm not - I made the premise to start with that I thought the best we could do is to take people who are non-performers and make them very poor performers. That's the best that we can do. A blind person who's profoundly blind - we will be able to reproduce some limited visual experience, but it's going to be extremely primitive compared to what you and I enjoy. And so if I wanted to make you see better, I would not use an implant in you. I would put you in front of a video monitor, and let you look at the signals that were coming down from the spy satellite or whatever.

David: The human eye is going to be better.

Prof. Norman: That's right - it will always be better, than what we can do. So I don't think we need to worry too much about that. The only thing that we might wanna worry about is the motor system. Now if you're a jet fighter pilot, and you're flying at Mach 1 and having a dog fight with some enemy or something like that a 10th of a second becomes very important. And it takes about a 10th of second to go from here [brain] down to here [finger] and if you can recognise this firing pattern directly then it gives you a 10% increase in performance. And if it's only one thing - which is to pull the trigger - that's the only signal you're doing, you do all the flying here [hands] but the
decision to pull the trigger happens up here [brain] then it could make the difference -
you know 10\textsuperscript{th} of a second - you can see something, fire and in a 10\textsuperscript{th} of a second it could
be out of the way. So that could be a significant advantage. So I think that there could
be - I'm not advocating for this but I would think that's the only thing that I could think
of where performance enhancement could be possible through an implant system. And I
think that the military has correctly decided that this is not a good idea. In fact there's
better ways to do that. A better way to do that would be to make your plane fly even
counter faster and turn sharper so the G-loads will be twice as high as they are now and take the
pilot out of the plane and let the pilot fly the plane remotely.

David: Telepresent.

Prof. Norman: Yeah, exactly. Then in fact, you can move much faster, and
dodge much more effectively, without having to worry about blacking out, which is the
limitation right now. So there are better ways to do that, than putting chips in people's
heads. So I don't think we have to worry too much about chips in people's heads,
period. Except for people who are really, completely disabled.

David: In order to bring them some performance.

Prof. Norman: That's right, exactly.

David: OK, last subject area. These are again a couple of slightly challenging
ideas. I don't know if you've read Thomas Kuhn - 'The Structure of Scientific
Revolutions'. He wrote a book in the 60s, which was basically about the fact that social,
economic and political issues have had a far greater influence on the progress of
scientific research than is generally admitted by the scientific community themselves.

Prof. Norman: It's true.

David: I think it's a given nowadays. It's seeped though - people may not
have heard of Thomas Kuhn but the ideas have got through.
Prof. Norman: Yeah, right. It's just reality, I think.

David: Given that DARPA are interested in CalTech's work on using the Utah array to develop exoskeleton weapons systems and what we've been talking about with this Mach 1 thing, for fighter pilots - pending the replacement of your array with a non-invasive neuro-mechanical response interface, but no doubt incorporating what has been learnt through research using the implanted array - do you fear that in the end, despite the many potential advantageous and beneficial applications of your work, history may remember your work as a crucial step toward the first thought-weapon.

Prof. Norman: No. I know that, as you've described, DARPA is definitely against implanting chips in people and the reason they're afraid of this is if in fact there's any sense in enemies of the United States that there are chips implanted in people's heads - a pilot who is shot down or an infantryman who is caught, will immediately go through neuro-surgery while they take this chip out, and they just don't wanna have that threat, to their infantrymen and their pilots and whatever. So I don't think that's ever gonna happen, so I don't think we need to worry about that, and the idea of using external sensing systems - you need to understand the technology a bit better than perhaps you do - the reason that's not gonna happen, I don't believe, really, is 2 things: you need, in order to do something - when I'm doing this [moves arm] there is not one neuron in my brain which starts to fire. Not one. There's probably 20,000 neurons, which are firing when I do this. Now I can listen to 16 of those neurons and I can start to get a signature whenever I do this which is going to be different than when I do this [moves other arm.] But, in order to distinguish this from this, I'd need probably at least 16 or 20 or 50 or even 500 neurons, listening to 500 neurons... So when you're putting any kind of sensing system on the - external to the brain, you don't have any kind of selectivity of this firing pattern. You've got this thing called a skull which is big sort of low-pass filter of spatial information. So individual firing patterns get spread out
dramatically and attenuated dramatically. Now you can also use magneto-
encephalography - these are superconductive little coils that measure magnetic
currents inside your head. We have a system over here at the Uni of Utah - Center for
Advanced Medical Technologies - which has one of these devices which can measure
little small electric currents which are associated with thoughts in your brain. Now this is
a huge device. It looks like a hairdryer on a scale of about 10 - this gigantic thing that fits
over your head which is just a gigantic huge thing. You stick your head inside this thing
and you can actually get small little currents that are flowing associated with certain
areas so if you're doing visual sorts of tasks you get currents excited over in this region
[points to area of skull], if you're doing sort of auditory tasks you get sort of firing in this
area [another area], if you're doing motor tasks you get firing in this area. And so you
could do some sort of global mapping, but you can't do high-resolution mapping. And so
you wouldn't be able to recognise the difference between this and this [moving different
arms in different ways] or whatever, with this kind of a technology. And it's a huge
technology to start with. Now they are making progress in these areas but I don't ever
see you getting down to the resolution of individual neurons, which is what - the implant
system gives you that capability, you can actually listen to individual neurons there,
groups of individual neurons. That's what makes control possible.

David: So the suggestion is that the implants are here to stay, they won't be able to replace them.

Prof. Norman: Yeah, I don't believe so. Now in fact - what I am hoping. Well I think the implants will be here to stay because they will provide a repertoire of therapeutic approaches to problems of the nervous system - but it's only one branch of therapeutic approaches. There's pharmacological approaches, there will be genetic approaches, there will tissue engineered approaches, there's a whole range of biological approaches to solving problems in the nervous system which don't exist today, just as ours don't really exist today either, which will give a neuro-surgeon, or a neurologist, a whole suite of tools to sort of look at, and say well with this particular problem which tool
do I wanna use? So I think that this is not going to be an exclusive solution to the problem in the nervous system but its one of many. So I think that these will be here to stay but I look forward to our understanding of the biological system enhancing to the point where we can actually do more biological solutions than these human engineered solutions. I mean, as sophisticated as our system is I still think it's kind of a band-aid solution and I'm not that proud of it. I mean it's the best that we've got today, perhaps it's the best that we're gonna have for the next 5-10 years, 20 years maybe. Until the biological solutions get solved. And there'll be certain problems where these will be the only approaches, maybe, like traumatic injury or something like that - shotgun blast to the face, the eyes are completely shot and there's no way you can regenerate eyes perhaps for another 200 years. So in those cases an implant in the visual part of the brain to provide some sight restoration might be the only recourse available. But there are some genetic diseases that maybe a genetic solution could maybe obviate the need for an implant system. Because you could get in there early, solve the problem genetically, and there's never gonna be a problem. But there's some problems that we'll never be able to deal with. Aging. There's a pathology that I, not sure we'll ever wanna deal with. Do we want everybody to live for ever? I don't know what the story there is.

David: That's very interesting. One of the main reasons why I'm doing this research is cause the area I'm studying is peopled with writers who have many paranoias, and one of the things I wanted to do was actually to bring it down to earth a bit.

Prof. Norman: OK yeah - well it's happened recently. [fetches article on Stevie Wonder.] This deal about artificial vision. Stevie Wonder, you know who Stevie Wonder is?

David: Yeah I do indeed.

Prof. Norman: OK. He's blind- he's been blind since birth, and he went to John's Hopkins who was doing a retinal implant program, and John's Hopkins went nuts
over this and they did PR in spades, and so this whole notion about will Stevie Wonder ever see raises all kinds of problems. And then, in response to that, there's a guy in upstate New York named Bildo Bell, who originally was here at the Uni of Utah, and he created an artificial vision system, and this picture actually appeared on the press - in a much bigger version - he actually sent this picture out to all the lay media - in a PR sort of self-promotion attempt. Now this picture, I think, did a lot more damage than it did good.

**David:** I can imagine.

**Prof. Norman:** And you talk about a cyborg concept - look at this garden hose plugged into this guy's brain - doesn't look good.

**David:** As Dr. Garcia would put it - 'kloogy'.

**Prof. Norman:** Exactly, well it is kloogy - but it also looks like a - it's a Frankenstein sort of image. And he actually showed that image to the world. Now I think that this raises a different issue which maybe we can talk about in a few minutes and that is - what kind of an implant system would people be willing to accept. And I don't think people would even be willing to consider anything as ridiculous as this. So what needs to be done is that you need to develop an implant system that is completely totally self-contained and powered through a wireless telemetry link. I mean that technology exists - wireless systems are getting quite spectacular now [holds mobile up] and people have built chips that can send signals over two or three miles. To send signals over two or three inches is a piece of cake. Not a piece of cake, but - we're working on that ourselves. But it's not trivial, but people have worked on systems like that. So one could imagine implant systems that were totally self-contained, and yes you do a small bore hole here you do an implant, you put the skull back, suture the skin up and the person would look perfectly normal. There wouldn't be this sort of cyborg image. And I think that's an important issue - for this technology: There's two things that have to happen for this technology to really win: the two things are: It has to work - flawlessly. For long
periods of time. That's a real challenge, right there. That's the biggest challenge. People are trying to figure out how to make it work -

**David:** Once you put it in you can't be going back to replace it every ten years

**Prof. Norman:** That's the real problem. Exactly, it's gotta work for decades. And how many systems work for decades? Very few. So that's a real problem. And the second problem is that it has to be cosmetically appealing, so if you implant something the person has to look like a perfectly normal person. Two big challenges. And right now we're not worrying about, necessarily, the wireless power and things like that, because we don't know if we can actually make things work the way we want them to work - yet.

**David:** But down the road when you're more confident about it working design is going to be a very important part of it.

**Prof. Norman:** For sure. Now the last thing we could discuss, possibly - I don't know if you have anything else on your agenda. The last thing is - an ethical issue which we're really trying deal with ourselves. We're about to enter human experimentation here. Yeah - we haven't done it yet. And we have a neuro-surgeon in place to do our work. And we have an institutional review boards - these are sort of governing bodies at universities, they're composed of scientists, lay people, priests, whatever, just a whole spectrum of people. So we're positioned to start working with humans. Now we're gonna be very cautious about this. And we're doing it, I think, in a very responsible fashion. We're certainly not going to the press and talking to the press about what we're doing.

**David:** Yeah the guy from CalTech was quite clear that there's none of this research on his website because of the animal rights lobby.
Prof. Norman: No. There're a real problem out there - we have less of a problem here. Utah is sort of frontiers out here, they go out and they shoot dear, and they bears and shoot everything, they shoot people here! There is a bit more of an animal rights movement that's happening here but compared to other places - England in particular - it's not a problem here yet. Anyway. The first experiments we're gonna be doing is in tissue which is gonna be resected normally. The tissue which is gonna be resected is - those are temporal lobe-epilepsy patients. These people seize every half-hour or every 45 minutes. Their life is hell - it's constant seizures. And they're refractory to pharmacological intervention - drugs don't do anything to these seizures. And the only way you can solve this problem - and I don't know how this was figured out, years ago, was they go in and they actually cut a piece of the temporal lobe out. Epilepsy starts in the temporal lobe, and it spreads everywhere. And if you go into the temporal lobe and you cut this piece of the temporal lobe out, then in fact the seizure incidence and severity can be considerably reduced or eliminated. So this is actually somewhat routinely done. Er here at the university they probably do 15 or 20 temporal lobe resections every year. So this human subject is gonna be undergoing neuro-surgery anyway. So we're gonna be implanting into these tissues for a half hour or an hour and listening to neurons, try and stimulate neurons, and then the tissue will be resected. We wanna make sure that we can implant these things safely that it doesn't any consequences to the implantation.

David: You'll be piggy-backing something that's going on already.

Prof. Norman: Yeah exactly - so you're gonna cut a hole in a guy's head, but that's gonna happen anyway. And so once we're quite confident that we can do this safely and efficaciously then we're gonna start thinking about implanting blind individuals. That's still quite a ways away, that's probably two, three years away, something like that. Now the ethical question comes in. What kind of a system should you be implanting in the first blind person that you're going to implant? In other words - before we implant something into a blind person, should we have system which is completely functional - should we give him eye glasses with a camera on it, the
processing electronics to take the signals, process them somehow, and send them down to the implant, and stuff - so it's a completely functioning system - so that in fact, if he goes through this process, he can in fact maybe use it. But right now we don't know what the design specifications for an optode array or a stimulation paradigm should be.

David: You've got to do the research first. So you need a guinea pig.

Prof. Norman: Yeah that's right - he's a real guinea pig. Now what we've tried to do, is to produce an implant system, I don't know we haven't resolved this one yet, but I think what we're gonna do is try to produce an implant system which will probably have a connector on it so there's gonna be this kind of Frankenstein concept - which I don't like - but the connector itself might have a little telemetry capability so there won't be this big garden hose of wires coming out, so it'll be a very delicate little wire that comes out. Or maybe not even a wire at all, we haven't decided yet, but the reason we don't want to put the electronics directly on the implant is because we don't have the electronics yet we can't design the electronics until we've done some preliminary experiments. So you can see there are some ethical dilemmas here - really ethical dilemmas, tough ones. And I just don't know -we have quite resolved these issues yet. If we wait to do an implant until we have a completely functional system - but if in fact - we're talking about a visual system at this point, partial sight for a blind person - why develop all this hardware, spend millions of dollars to develop all this hardware, if in fact the premise, which is that patterned electrical stimulation of the visual cortex produces discriminable pattern percepts, proves not to be true. Then you've wasted millions of dollars and you've wasted a lot of time - when you could in fact out this information earlier on just through a simple sort of hard-wired system rather than telemetered system. Also the telemetry system itself decreases the reliability of the system - it's another level of signal processing that has to be done, another opportunity for device failure.

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Conversation moved on to the deaf community's rejection of the cochlea implant, and the issues of disabled people's 'social barriers' approach. Prof. Norman was intrigued but seemed confident (as ever) in the effectiveness of the technology in the end. The cochlea implants as originally introduced were clumsy and kloogy and this was the reason they were rejected. The heightened eyesight of the deaf and the heightened hearing of the blind were advantages any deaf person would give up if they could hear instead, any blind person would gladly swap for the power of sight. The special qualities brought by autism or Downs syndrome likewise.

I then had a brief chat with one of Prof Norman's post-doctoral colleagues who raved about the EHPA stuff, and recommended the cyberpunk novel 'Amour' by John Steakley, which I bought later that day and proceeded to read over the next few days.
iii. Stelarc

Interview with Stelarc, in Nottingham Thursday 10th June 1999

David There are many practices, involving the body, both the remedial -
including reflexologists, osteopaths, chiropractors, Chinese herbalists and acupuncturists,
and so on - and the enhancing - including the many and varied martial arts of the far
east, yogic and tantric practices from the Indian subcontinent, and so on - which share a
common understanding of the human body as an integrated and holistic whole. What is
your opinion, your take on all that?

Stelarc Well I did yoga for twenty years [laughs] and also I was very fascinated
by acupuncture, not that I actually did any practice with it, but [I had] a collection of
needles, and diagrams, and did a little bit of basic stuff on it, and I've had some
acupuncture treatment done to me by a Chinese acupuncturist in Japan who's blind, so I
sort of went the whole hog with that one. Well firstly I'm intrigued about these past
practices and strategies for harnessing the energies of the body and the notion of the
body as a holistic, total entity. I think with some of these practices though, 'holistic'
really is a word that covers a lack of knowledge of the body beneath its, within its skin.
In other words, yes, there was, I guess, a Chinese 'science' for treating the body, but it's
essentially a surface treatment, pricking the skin with needles or a variety of needles.
Certainly there was a philosophy and thousands of years of practice but really it hid the
fact that there was no in-depth anatomical or medical knowledge. So I don't get carried
away too much by what we call holistic practices. And of course herbal medicines, yes,
in a similar way, all that means is there's a kind of a lack of pharmaceutical and medical
knowledge of how the body functions internally. But through common and everyday
practices, yes, certain herbs are found to assist as certain remedies. That's the first
point. Secondly, with practices like yoga and martial arts; yoga is an interesting physical
conditioning and fine tuning for the body, for transcendental pursuits. In a sense you're
programming the physicality of the body to be able to perform in a kind of spiritual way,
and although this is interesting as a historical practice I don't think it has much relevance these days. The question for me is not functioning with sensory deprivation, but how to function with sensory overload. I mean I want to be able to function with everything switched on, with alien information that my subjectivity can't directly experience, with alternate interfaces that allow my body to better and more effectively collaborate with its technologies. With Martial Arts of course, the notion of Ki or Chi, this idea of sort of harnessing energies beyond the body itself, in other words your incredible power to perform some of these martial arts feats, has to do with the idea that you're not just simply physically conditioning your body but somehow you're harnessing the energy around you and focusing it. And this is an interesting notion of course and one begins to see a glimmer of the body not simply as an ego-driven entity with a personalised self and identity but rather a body plugged into a greater system of things, where awareness is extruded beyond the skin, and this is in fact what technologies enhance and amplify. So yes I find these practices interesting but I think they're more historically relevant, now, rather than strategies we should continue with. Oh by the way, for me too, when this person says 'the body', this person means the total, physiological, phenomenological, cerebral, operating entity in the world. The distinction between mind and body or mind and brain is really counter-productive, and really I think philosophers like Merleau-Ponty, who talks about a contextualised body, an immersed body, a body that in a sense constructs the world through its experience of the world - in other words, space and time are functions, in a sense, of the body, not just simply objective states that you measure. I find those philosophers most interesting.

David One of the things that intrigues me is how the historical holistic approach, and the modular conception of the multifunctional prosthetic body square up together. Obviously both conceptions of the body view it as a vehicle - whether, historically for the holistic practices a vehicle for the soul or in terms of the multifunctional modular body a vehicle for mind, a vehicle being something you can muck about with and change and augment - and there's both remedial and enhancing practices in both systems. But the
holistic and the modular physiologically don't kind of mix. So as you say there's a historical level, but the new modular stuff that you talk about in some of your writings seems to be a break from that on some sort of fundamental level.

Stelarc Well it's just, maybe, not so fundamental but it's the idea really that - it was good pointing out and associating the holistic with the modular and that, for you it seems that they were both vehicles for the spirit or the mind, but in fact the notion of the modular body doesn't necessarily follow with the modular body that still is a vehicle. I mean the idea that you may have replaceable components or parts of the body are interchangeable doesn't necessarily mean that somehow it's a disembodied mind that is of importance and the rest of it you can kind of muck around with. In other words, we don't still have to perpetuate the notion of some intrinsic essence or mind to justify or explain either the holistic or the modular, and so all we mean there is that other physical bodies can operate and provide life-support systems for bodies that have medical problems. I don't think it's necessarily a relationship of mind and modular body, but rather functioning bodies and malfunctioning bodies, so that's really the distinction, and malfunctioning bodies would be better designed as modular bodies because you could then we could more easily replace things that are failing. That's the problem with the analogue body, it's a very subtle and complex system, but it's also a system that, where a small part of it fails, the whole system can die. Whereas, say, redesigning a body in a more modular way might allow you the possibility of sustaining that body and for it to be effectively operating for longer periods of time because failed components can be replaced more easily.

David Okay, pushing the holistic-modular thing to its final extreme, right out on a limb: The medical body - the body as understood by the medical establishment - is a compartmentalised structure that lends itself more to the modularity of the prosthetic body than the integration of the holistic body - in the way that the holistic body doesn't go beneath the skin, as you were saying. At present, at the scale of individual bodies, in our hospitals, the medical model holds sway, and practices using the holistic model are
labelled 'alternative'. At larger scales, however, incorporating whole environments, the holistic model of ecosystems is held to be an accurate picture - enough for concern about the health of the planetary ecosystem to have caused major policy changes in the industrialised nations - much to the chagrin of corporations for whom the compartmentalised model of the environment allows easier - and cheaper - disposal of waste. Does the prosthetic body, by dint of the modular or compartmentalised model it shares with both the medical establishment and polluting industries, [laughter] threaten the health of the holistic body, as those industries threaten the health of the holistic ecosystem? The problems of scales and choices......

Stelarc Well it's an interesting observation, but I don't know whether we can switch from one scale of observation to another. Er. No I don't think so. [laughter] I think this is one of those yes/no things.

David Shall I give you my get out - what I think it might be? I think there's a pragmatism involved here where changing from micro to macro actually - you know - the tools for analysing the micro and the tools for analysing the macro just are different, and it's not necessary to make them cohere. That's a very postmodern approach. I'm not sure it..... It's a puzzler, isn't it.

Stelarc Yeah that's a difficult one to bring my own sort of experience to. On the other hand, this also assumes in a sense a kind of a convenient separation of the body with its environment and so in this kind of analysis what we're talking about is somehow sort of the body on the one hand and the world on the other, and then we're talking about them also on different levels of scale, whereas I think what technologies tend to do is allow the body to extrude its awareness, extend its operational possibilities beyond its biological physiology and the local space that it occupies. So human bodies now are regularly, in a sense, possessing and performing much more extended, well I guess we can say, electronic space, rather than, you know, I guess we would have to
start making distinctions now between the kind of natural environment and electronic media. But within that electronic space of interfaces and hard-wiring of the body then the body can function in these extruded and extended ways. I think one just has to reassess all of these old metaphysical models of Platonic homunculus or spirit inside the body, driving the body, or a Cartesian split between mind and brain, or a Freudian notion of id, ego and superego, as again, something that each individual body possesses. One has to really sort of reassess the notion of a body that is continually becoming not only prosthetic porous and more fluid in its exchanges with the space that it's function within. So that premise depends on conveniently separating the body with the world and in electronic space at least that's much less meaningful to do that anymore. So what's gonna happen is that there is gonna be this sort of more - the exchanges between the body and it's environment increase in more amplified and deadly forms.

David Shall we move on to section two. [laughter]

Stelarc Yeah [laughter]

David You've already touched on some of this already, which is great. Moving away from all that holistic stuff, completely, into another realm of philosophy altogether, the mind-body duality game. Okay, first thought. Personal responsibility, in legal and ethical terms, [laughter] - you know where I'm going, don't you - is predicated on the basis of the control over the self as a body exercised by the self as a moral intelligence. This is a kind of dualistic mind / body set-up, its kind of what we understand in today's culture as defining humanity, and its enshrined in the fundamental structures of our society. Now, in Fractal Flesh you signal the potentiality of change in this basic set-up, in a more immediate and realistic way than, RoboCop, or Universal Soldier. Giving up control of the self as a body to the moral intelligence's of remote viewers clicking buttons on the website is one thing. Such distributed agency rightly highlights - as you were saying - the post-structuralist death of the Subject. Giving it up to the data flow of the internet activity itself - which you wrote about in the notes - [laughter] - would surely -
question - be the ultimate in dehumanisation, signalling the death of the social. It's quite close, in a kind of legal / ethical sense, to the pre-humanist world-view in which theological moral intelligences were the ultimate power over ourselves as bodies, - [laughter]

Stelarc Get to the question quickly, because I'm just losing it all [laughter] we'll have to subdivide this into six [laughter] go on, go on

David - those 'possessed' by one sort of inhuman force were freed through appeal to another.

Stelarc That's really lovely [laughter]

David What then, is post-evolutionary about diminished responsibility?

Stelarc [laughter] Well I had all sorts of thoughts going through there and now..... it's just like the person who stands up in this question and answers - especially after you give a talk and they say 'I have four questions for you,' and by the time they've given you the fourth one you've forgotten all the others.

David I should have broken that one down a bit

Stelarc Yeah, yeah. Erm, let me just try and remember some of those issues. Firstly the notion of the cyborg which you alluded to. Yes the Fractal Flesh possibility speculates about the idea of the cyborg not simply being a cyborg individual body - a kind of medical military model - that has been damaged biologically and is reconstructed with technological components; so instead of this cyborg body idea the cyborg becomes a sort of cyborg-system of a multiplicity of bodies spatially separated but electronically connected - the internet perhaps as an external nervous system that connects these operating nodes, and allows for an extended operational system to come into being, or extruded awareness to come into being. So yes, notions of individual and ethical responsibility seem to be challenged in those kind of models, but the sorts of models that
are proposed or seemingly proposed in these performances don't turn the Subject into an automaton nor into a kind of fuzzy spiritual noosphere - you know Teilhard de Chardin - rather, what's intriguing about these operational models, these new cyborg systems is that a body fully aware can experience the remote promptings of other bodies in other places, can become a host for a multiplicity of Subjects - not in a sort of schizopathological way but in an aware and collaborative way. We're not necessarily undermining, but rather constructing more complex bodies, in other words from the sort of simplistic model of a body with an own ego and awareness, here we're talking about bodies with egos and awareness but also hosts for other sorts of agencies, remote agencies. So what's interesting here is not the notion of control, nor the notion of subjugation, nor the notion of the automating of human awareness, but rather the construction of more complex and extended operational systems. So it sounds a bit of a buzz, but that's the best way of talking about that, I think.

David No that's good, that answers, I mean that's quite a challenging paragraph. Okay then, next one. Granted that the kind of kinaesthetic position and orientation, and tactile and force feedback, systems, that you mentioned in an audio clip on your website, were set in place over the Internet, do you envisage such a cyber-space as a potentially permanent home for an identity divorced from the human body and living in a body of networked computers? In short, do you think it's potentially possible to upload identity? Is this the same thing as artificial intelligence?

Stelarc Well I don't think uploading identity or in a sense uploading the body - body data - is necessarily gonna happen, in like, let's jack this guy in and suck out all the essence and like leave this dead body behind, and then we have an artificial intelligence on the web. I don't think it's gonna happen in that way, so it's kind of like in a sense we're sort of speculating about a possibility but beginning from a present body, and I don't think that in itself - I think intelligence always has to be embodied. To understand intelligence as we understand it, intelligence is that subtle and complex response to the world that is understood by other bodies through the medium of language, within the
social institutions within which we operate, from the cultures that we've been conditioned in; a brain is not a brain if it doesn't have senses transmitting information from the world that it can process and the end effect is that it enables it to respond to the world. A brain isn't a brain without legs, because a brain without a point of view, without different points of view, without a vision that provides those different points of view, would just be a lump of quivering, grey-pink jelly-like material. That's not to say that in our future human history we won't have hybrid human-machine systems or intelligent machines, it just means that I think it's a very simplistic idea to begin with a body and to suck out its inner - so I think it will be possible to programme or construct artificial intelligence and artificial identities but whether you do this by sucking out this stuff from a body and by jacking it into - I'm not sure that's the way it's gonna be done. I mean I suspect our human history or our future will be inhabited by all sorts of creatures based both on carbon chemistry and genetic coding and silicon chip circuitry and other kinds of new sort of quantum mechanical devices. But the idea of this sort of simplistic splitting of mind and body or data from physiology I don't think is gonna happen in the way that sometimes we talk about.

David Sociobiologists and behaviourists - [laughter]

Stelarc I have fond regard for both of those - [laughter]

David - subscribe to a kind of genetic determinism that would have even the most seemingly ephemeral cultural phenomena motivated by blind Darwinian forces. Post-feminist sociologists, [laughter]

Stelarc you say that with a voice a few octaves higher? [laughter]

David - on the other hand, subscribe to an ontological performativity that views the very substance of the body as a product and manifestation of the performative citing of pre-existing roles.
Stelarc Now can you explain that? [laughter] No it's all right I think I've got the general gist of it... [laughter]

David Somewhere in between these extremes the realms of mind and body meet, in a single entity, like the wave and particulate forms of electrons. [laughter] What is your take on this dilemma?

Stelarc [laughter] Hm. Interesting one. Can you repeat the question again please. Just the very beginning - that very first part

David Sure. There's the sociobiologists and behaviourists -

Stelarc Right okay okay I got you, I remember now. Well I mean, sociobiologists; as I said I do sympathise with the analysis of the body and how it performs, and on the one hand yes up until now there has been a sort of genetic evolutionary [model] - a model that seems to effectively predict a lot of our behaviour - even altruism - which was initially a puzzle within these realms, and I think behaviourists made a heroic effort to eliminate mind as an explanatory entity and attempted to deconstruct intelligence and awareness through behavioural performance, through behavioural indications. I mean, how do I know you're intelligent - it's not by examining the inside of your brain it's by the nod and the wink you give me, the smile that you make when you listen to my answers, the words that you've written as questions. One can well argue that you are more or less intelligent as your behaviour is more or less subtle and complex in response to mine. So I really sympathise with those, but of course having agreed that this is a seductive way to analyse the body up til now - and one can well argue that ever since we were hominids and developed bipedal locomotion, two limbs become manipulators, we begin to construct tools and instruments - machines - in other words the body has always been a prosthetic body, in a way we have always been cyborgs, in a way we have always been zombies, because I don't think we ever did have a mind of our own, as our western philosophy tended to want to affirm. On the one hand we fear the involuntary or the mindless, on the other hand we fear the automatic,
or the cyborg, but the human body, one can well argue, has always been a zombie, will always be a cyborg, so from that point of view one can also argue that ever since we evolved as hominids technology has constructed our humanity. It's not an alien other that appears at the end of the millennia, it's something that has always been part of the human trajectory, it always defined what it means to be a body, what it means to be human. In that way, technology now, with the body, constructs strategies that quicken the possibility of change and allow a more complex intervention in the development of the body. So I don't think evolution is any longer the significant process. One can well argue the significant planetary pressure now is not the gravitational pull but the information crush - this idea that information can now transform the body. The seductiveness of technology is that it generates alternate and alien bits of information which allow us to construct new paradigms of the world which in turn allow us to construct other technologies and so on. Without this kind of augmenting and alien quality of technology there wouldn't be this constant development of newer technologies.

[laughter] Some things I phrase before, and then I can come out with one liners, and then other times I'm sort of really struggling...

**David** No, no, not to worry. Erm last section. More cultural stuff. Now this first question might be a 'No' question because it's slightly political.

**Stelarc** It's slightly political. Oh yeah.

**David** 'Frankenstein Foods', 'Terminator Seeds', and 'Designer Babies'

**Stelarc** Oh sounds great! [laughter] Sounds great.

**David** - these and other pithy tabloid summaries of the prospects for bioengineering all carry a certain scepticism. The 'corporate muscle' of the multinational companies -

**Stelarc** Oh that's great... [laughter]
David - responsible for the development of the biotechnology industry is inevitably more interested in profit than the personal or ecological welfare of its clients - despite the cynical 'feed the world' spin. It is common knowledge in the sociology of technology that capitalism, the Protestant ethic, and the rapid development of technology all go together hand in hand, [nods of agreement] in a cultural convergence that's unique in history - now. In bringing our attention to post-evolutionary experiments, are you:

(i) wholeheartedly confident in the modernist myth of progress that has brought us thus far?

Stelarc Only partly so.

David (ii) acquiescent in the face of some technologically deterministic inevitability you want to make the best of, in the meantime?

Stelarc Probably.

David (iii) reflecting back to us through your performances an all-too-near future we should be thinking seriously about before we take the plunge?

Stelarc Not really. [laughter]

David Or (iv) something else entirely? [laughter]

Stelarc Well I think on the one hand there is a kind of - well - critique is easiest when it's alarmist. When we take the kind of ethical pedestal, when we express concerns about multinational corporations seemingly only wanting to make a profit, but I mean, I think society is much more complex than that, there's lots of feedback loops, lots of checks and balances. Now that's not to say certain strategies are not dangerous, like genetically modified plants, especially if they are going to run rampant and affect the local ecologies and other living things which are part of a food chain that effectively ends inside of us. So of course one has to be careful, and our human history, especially in the
The twentieth century has been replete with drugs that have produced as much harm as
good. On the other hand I think this sort of consumerist - capitalist model has
economically driven, and allowed us to access computers and other devices that make
our operation in the world more interesting and more collaborative and more
communicative. So no I'm not a sort of naive proponent of all this technology. On the
other hand I'm not alarmist about it either, and also unfortunately you either somehow
define arbitrary boundaries and say well, electric lights are up, okay, breeding certain
cattle or other animals for foodstuff that's okay, but genetically modified food or
genetically modified plants that's something else. So I mean where do we arbitrarily - I
think really the question is how we manage change and perhaps we haven't developed
an adequate science of managing change. Rather than being alarmist about any change
that comes along. So yeah, I'm not particularly good about talking about these sort of
political, sort of economic.

David I just kind of wondered where you were at with it.

Stelarc yeah. So there are some short answers and some slightly longer ones.

David Erm. Penultimate little para. Cyberpunk fiction has taken off since the
early eighties. Writers such as Gibson (Neuromancer) have been joined by others like
Neil Stephenson (Snowcrash), Michael Marshall Smith (Spares), and Jeff Noon (Pollen).

Stelarc I don't know them all, but I know some of them.

David Do you read these or other authors like them? What do you think?

Stelarc Well I have to admit, I did read a lot of science fiction in high school.
But I have read almost nothing since. And even people like William Gibson, who I've met
and, you know, consider friends, I mean I really haven't sort of carefully read their
books. It's sort of like. I guess there's sort of - I'm not so interested in science fiction, or
science fiction as a vehicle for speculating about the future. This really is within a certain
discourse and a certain style of writing that can become incestuous within its own parameters. As an artists what's more interesting is the idea that you can construct plausible, possible plausible, interfaces, actual interfaces that you can experience, and that generates ideas and other performative possibilities, and sometimes quite unexpected ones. So what's interesting I think for artists is this collapse between the imaginary and the actual, whereas in science fiction generally speaking there never is that collapse; or maybe put in another way one can see a lot of science fiction as merely a projection of science present, and in a kind of arbitrary speculative way, whereas I think what's more promising in an artistic approach is that the imaginary is generated, an actuality is constructed, and interface produces experiences, and that leads to more authentic ideas. I think the notion of ideas being authenticated by actions is very important. It's what science generally does. It's what we've always done but it can be clearly seen in scientific pursuits because you might have a theory but unless you have the experimental data to back that up, it's just a species of imaginary speculation, and that's why I see artistic practice as in a sense as important as scientific pursuit. What's in between I think is much more problematic - including philosophy and metaphysics.

David Okay, last one - you'll like this one.

Stelarc Oh I thought that was the end I was trying to come up with a final grand...[laughter]

David One thing many cyberpunk writers seem to focus on is the fecundity of the blurring of boundaries between man and machine. J. G. Ballard's Crash in particular focuses upon almost pornographic sexuality in the encroachment of technology into the body. Nymphomation is a favourite topic of Jeff Noon's.

Stelarc [laughter] That's great, I haven't heard that one.
David Have you explored this at all?

Stelarc [laughter] Well I want to now. [laughter] No well, I guess not really but, the kind of cybersexual implications of the Stimbot System, muscle stimulation system, that idea that a remote intimacy is possible - an intimacy without proximity, without skin contact - the idea being that this is not simply a sensory stimulation but a body prompting system that if I was here in Nottingham and had a remote lover in New York, you know, touching my chest here would prompt my remote lover to caress her breast over there. I would feel a touch on my skin, from the body of another looping back from another place, as a secondary and augmented sensation. We would be in a sense extending that sensual and sensory loop beyond the proximity of two bodies in the same place. So I think there are some interesting notions of experience of remote sensation of sexual experience with such a system. As there are in that same instrumentation being used by two dancers who both having transmitting and receiving systems could have a physical interaction with a part of each others' bodies, so the left side of my body might activate the right side of yours, the left side of yours might activate the right side of mine, so we would have this kind of physical collaboration between bodies - again not in a metaphorical sense, but in a really physical way. With this new performance which is being now structured, called Movitar, this idea of an intelligent avatar, having a kind of an inverse motion capture system - [tape ends, and turns over] - orientation sensors map my physical movements onto a virtual body and I can in a sense access and activate a virtual body - perform in cyberspace, do virtual tasks, have virtual sex with another virtual body who is accessed and actuated by another person in another place. But imagine if the opposite were possible - of an inverse motion capture system where an intelligent avatar would want to perform in the physical world by accessing an actual body, and in this way this body could be possessed and be the medium of performance for a virtual body, an avatar. Now if this avatar was VRML entity based on a website anybody anywhere could log into it. But from the point of view of an intelligent avatar, it could theoretically perform with anybody from any place.
either sequentially with one body at a time, or simultaneously with a multiplicity of bodies, spatially separate, electronically connected to it. In other words, this avatar could choreograph a whole cluster of bodies accessing it. So this avatar could perform in the real world by possessing a physical body. And if this physical body had electrodes not only on its limbs but also on its facial muscles then the avatar would not only be able to walk in the real world, it would be able to express its emotions in the real world by contracting the facial musculature and producing crude expressions in the face of the physical body.

**David** What a fascinating vision. [laughter] Well thank you ever so much, that's brilliant.
iv. Eduardo Kac

Interview with Eduardo Kac at Centre for Interactive Art Institute, Newport, Wales 16/12/99

Kac: Would it be counterproductive to you, if I would state, as I would normally do, that by no means do I see myself as a Performance Artist?

David: ...that doesn't... the title isn't....

Kac: ...And I can explain to you why I look at what I do this way – because from --- say from the early futurists and others, public manifestations, to Stelarc and Orlan, you have a very well developed field which you can probably call performers, throughout the 20th century. I did start my career with performance. I had a very specific project that lasted about two and a half years – say approximately two years – in performance. It was a very specific project that, although it didn’t start anticipating its conclusion, in two years time it became clear that I had reached a closure and it was time to do something else. But that was between early 1980 and early 1982, so 80/81, 81/82. But I really have never come back to that, instead it seems that everything that I have done involved periods that I strongly faced (?) and then synthesis into something new. And these new things that I’m referring to would fall into four new categories that I have coined. One being telepoetry, the other being telepresence, the other being biotelematics, and the other being transgenic art.

David:... yes and it’s particularly the biotelematics and the transgenic areas of your work that I’m interested in, with regard to my research.

Kac: OK we’ll go onto them but this all to say, that -

David: - that it’s not performance art –
Kac: It's not Performance Art, although it has here and there, performatic elements. In some cases the action, y'know, is the viewer who is called upon to become an agent and therefore participant. But even when I do something, I don't do it in the sense of erm – Time Capsule is different in the sense that it has a very strong personal dimension – in terms of personal history, but with pieces such as the telepresence garment for example, or the biorobotic piece A-Positive. I see them not as performances but as interactive artworks because the premise there is not that I am doing this for you to watch, the premise is that you can do it yourself. It truly is an interactive piece. The emphasis is on the fact that members of the audience can step out of that mode of audience, and experience for themselves what it's like to wear the telepresence garment. It's not about you wearing it and you watching me. You can wear it, and I can be in your body, it's not putting the emphasis of me developing a name for myself in performance. The emphasis is really on the nature of that experience and from my perspective the more people experience it the richer the project becomes, so it's really interactive in the sense that it's for everyone to experience. Not for me to do it and for you to watch it.

David: I like that.

Kac: And the A-Positive biorobot is the same thing. If you are comfortable enough with donating blood to the robot and gaining dextrose in exchange, and watching, at the same time that you get the nourishment, watching the flame come inside the robot – if you're comfortable with that idea.

David: - though I hear at one point it was bubbling, rather than flaming –

Kac: (laughs) yeah that was a bit scary. Yeah – we got some bubbles – but hey this is all part of doing art with things that have no established frame of reference – there's a great deal of learning that goes on the technical, perceptual, cognitive levels – it's all a big learning experience. So that is, then, that there could be performative elements here and there but they are part of a new complex, they don't predominate.
David: Got that, right, ok. So – I’ve got three areas of questions – they’re really just paragraphs to throw ideas at you and see what your response is.

Kac: OK.

David: There’s three areas that we’ll look at – the holistic versus the modular, in terms of conception; the duality of body and mind; and the culture of body and mind. So there’s three particular areas. So the first one – what of holistic approaches to the body? Obviously there’s lots of practices, involving the body, both the remedial – including reflexologists, osteopaths, chiropractors, Chinese herbalists and acupuncturists, and so on, all of that sort of thing - and the enhancing - including the many and varied martial arts, yogic and tantric practices, and so on – which share a common understanding of the human body as an integrated and holistic whole. I don’t know what your initial reaction to all of that is, what’s your take on all that?

Kac: On holistic approaches to the body? Well, like everybody else, I am also a patient, I also go see a doctor on occasion for various reasons, and I am profoundly disturbed by the standard western medical approach – er my doctor for example doesn’t even care to read the chart in private before walking into the room. He says hello, shakes my hand and then picks up the chart and then in front of me he reads the summary of past illnesses or past complaints, of various sorts, and then asks a question with a smile on his face about how are we feeling about ‘boom’ whatever that ‘boom’ might be. And what he’s telling me by doing that is of course he doesn’t care – he’s ignoring the emotional dimension of healing – he’s treating you as a sum of parts, an ignoring that you are in fact a very complex individual, and everything has a bearing on everything else, in your health, and of course he’s also ignoring the fact that I’m aware of that, and both I find profoundly disturbing.

David: That’s really interesting. OK. One of the things that intrigues me is how the holistic approach we’re talking about, as opposed to the modular conception of the multifunctional body – the sum of parts – how these two square up together,
philosophically. Obviously both conceptions of the body view it as a vehicle, in a sense. Historically, for the holistic practices, as a vehicle for the soul, and, for the modern western medical approach, as a vehicle for mind. Importantly, a vehicle obviously is something you can muck about with and change and augment, and what have you - and there's remedial and enhancing practices in both. But *physiologically* they're very, very different. Enhancement through yoga for example doesn't replace internal organs or create wet interfaces with digital technology to expand or augment the body. And once you have changed the body in this way the 'Chi' is fundamentally disturbed or one's 'chakras' misaligned.... What is your take on all this? How do you feel about the way these two physiological things mix?

**Kac:** You mean the Western Medical approach that takes care of individual parts, and the eastern approach to states of consciousness. Is that what you mean?

**David:** Not specifically, no, what I think I'm trying to get at is that if, to replace parts of the body, either with other people's organs, or eventually, as we're moving towards it, animals and ..

**Kac:** xenotransplantation?

**David:** Yeah, and also digital replacements - do these new organs - particularly the digital ones - fit into the integrated holistic body, or do they disturb that holistic body?

**Kac:** Erm, well, of course if you don't have a living person, the discussion of whether it's holistic or not loses context because I personally do not believe in life after physical death. I'm interested in concepts of - from an imaginary perspective of hosting other individuals - I'm interested from an imaginary perspective but I don't think of them as facts at the level of ordinary life, so for me once the body ceases to live as we know it, then it's handed back. So from that perspective, if you can't keep a person alive in a healthy productive mode of existence then the point is neared. So if what it takes to do
that is xenotransplantation, or hip replacement, or tooth implant, or whatever it is – I’m all for it, I have no problem with it at all.

**David:** Do you think we might end up with *non-organic* (?) bodies, is that possible?

**Kac:** Hmm. As... you mean, a full body that is not organic?

**David:** Yeah. If we can replace bits, can we replace the lot?

**Kac:** I think that’s highly unlikely. Erm... because for a very simple reason, like I said what’s exciting in Stelarc, what’s exciting in Orlan, although they’re very different, so to compare them in their methods and their goals and their interests – but what’s exciting in them is not necessarily what the... the way they could be construed as blueprints for a post-human future. What’s exciting in them is the powerful image that they successfully create, that they evoke. The dangers and potentials of the changed meaning of what it is to be human today. So in that sense we have to keep in mind, that say, cosmetic surgery, yes it is true that a greater number of teenagers today is taking advantage of cosmetic surgery than ever before and the numbers are staggering compared to early on, but that represents, really a fraction of a fraction of a fraction of a fraction of a fraction of the human population. So to what extent do we take the exception as symbolic of course of events as they will unfold and to what extent we contextualise this small percentage and understand that this is a very particular localised phenomenon that has to do with teenagers and mostly – with exceptions – have to do with severe disorders or abnormalities but for the most part is really cosmetic, this has to do with children of wealthy families living in cosmopolitan cities, happening under pressure of media etc etc. which is really not the totality of the requirement.

**David:** That’s very interesting. Shall we move on from that – we’ve probably exhausted that subject, let’s go on to mind-body duality
Kac: One more sentence

David: Oh go on...

Kac: - which is to say that - these technologies, they will continue to develop and emigrate to the body, but always at the service of medical causes. I don't personally believe that people are going to be dealing.... Radical transformations for purely cosmetic reasons. You have exceptions, but these technologies are primarily at the service of illness, and disability.

David: OK – so the mind-body duality bit, first thought – personal responsibility. In legal and ethical terms, it's predicated on the basis of the control over the self-as-a-body, exercised by the self-as-a-moral-intelligence. This is a dualistic mind / body set-up, but its intrinsic in our legal systems – it's what personal responsibility is about.

In A-Positive and Time Capsule you signal the potentiality, to my mind, of some change in this basic set-up, in a more immediate and realistic way than, say, in movies like RoboCop, or Universal Soldier and thinks like that. Talking to Simone Osthoff at ISEA97, she quotes you as saying, that, "We are no more masters of our machines than we are at their mercy.” Now this has some serious implications, I think – that really fascinate me. Giving up exclusive control of the self as a body in an exchange of body-fluids with a biobot, is one thing. Such distributed agency perhaps rightly highlights the post-structuralist death of the Subject.

Kac: Distributed cognition.

David: Yeah. But, for all the arguments you use in your text on Time Capsule against the boxing of the body by the current desktop interface, and in favour of the potential of moist interfaces, I'm interested in the idea that giving up one's identity as a unique human being to an online database of animals – albeit in an Interactive Art context - represents surely something... an ultimate in dehumanisation,
Kac: Yeah – that’s one very important aspect of that piece.

David: So, what intrigues me is how that impacts upon personal responsibility as a legal and ethical mind-body philosophy. What effect does the 'obsolescence' "of the skin as a protective boundary demarcating the limits of the body" and the introduction of wet interfaces have upon personal responsibility? Are we moving into an era where, legally, you can go, sorry it wasn’t me officer, it was the computer moved my arm.

Kac: In an attempt to start answering this

David: (knowing laughter)

Kac: (smiles) let me develop what might be at first perceived as a parallel track, but is intrinsically connected, because the question of cloning which of course opens up to transgenic art is also another emblem of this process of transformation – and then I'll come back to tie it up. You know Slavoie Dijec? He’s an author you might want to look at, he’s originally from Slovenia, he’s living in New York now. He wrote what I think so far is the most interesting take on the question of human cloning because everybody’s very fearful of it, I certainly am not I’ve no objection whatsoever to it – provided that it’s safe! That’s the only problem – you don’t wanna create monsters, but I see no objection on the moral ground, because after all a twin is another person that shares the same genetic blueprint that you possess, there’s no problem there. So, but his article is an objection to the purported fears that most writers reveal, in regards to the loss of individuality, to the loss of a sense of self. And to sum up a complex argument – his argument – he’s basically saying that if you haven’t lived under a totalitarian regime you really don’t quite know what the loss of identity and the loss of the self means, because it’s the suppression of liberty that is the most traumatic gesture, in terms of the erasing – will power, freedom to pursue any idea, any dream, freedom of expression, free will in general, and the existence of another person, 30 years after you seems to pose no such problem, in light of situations in which you are effectively denied free will. And of course the question of your clone has no free will, well – neither do your children when you
decide to create them, and that poses no moral problems. So that's the question of responsibility – and this is one zone of my answer.. the other interesting example is that there is a company in the US that makes tags for cars – very similar to the tag I implanted for animals, except these are bigger, they're for cars and they allow one to retrieve the car, if it's stolen one can use a satellite to find out where the car is, and retrieve it – and he gets thousands of calls all the time wondering if this technology's available for children. And you may say that – and I'm not saying I'm in favour of that – but one argument is parents always make decisions on behalf of children, and if the price of re-uniting a family would be a small invasive procedure, you have to ask what would be the worst that could happen. Is the child being separated forever from the parents, or the implant of something that is safe and would enable the solution of such a traumatic problem. I'm not advocating it – let me state that very clearly – but I'm saying that these are problems that we've never had to deal with before. The technology's not there but my piece certainly points to that direction and it becomes an issue all of a sudden – so at what point freedom and responsibility, socially, become intertwined in these differentiated ways – so I – of course I don't have an answer for that. As is typical of my work I find that the rearrangement of relationships that a given technology forces cannot be manicheanistically resolved in a 'I'm in favour'/I'm against'. My pieces are always attempts to examine the complexity of a problem, they often do that, and I certainly learn a great deal from work to work, but I am not seeking these stable antagonistic positions.

David: last thing I want to any of these questions is Yes or No. (laughs)

Kac: So I don't believe that one will transfer one's social responsibility to machines, although you will encounter on occasions – you go ask for something and they'll say it's not my fault the system is down – you'll hear these things, but on a personal individual level you're always responsible for the moral decisions that you make.

David: Thanx – so finish this section –
David: Right – Socio-biologists and behaviourists subscribe to a kind of genetic determinism that would have even the most seemingly ephemeral cultural phenomena motivated by blind Darwinian forces. Post-feminist sociologists, on the other hand, subscribe to an ontological performativity that views the very substance of the body as a product and manifestation of the social - a performative citing of pre-existing roles. Somewhere in between these extremes the realms of mind and the social, body and the genetic, meet, in a single entity, the human being, perhaps like the wave and particulate forms of electrons. What is your take on this dilemma?

Kac: You’ve only three hours, but you make it worthwhile don’t you?

(laughter).

David: (laughter) It’s a difficult one.

Kac: You’re talking about Wilson when you talking about socio-biologists right?

David: Yeah, and also all that Dawkins stuff, The Selfish Gene and so on – very anti-sociolological - everything’s down to the genes and biological determinism and so on.

Kac: The genes want to preserve themselves and pass themselves on.

David: Every aspect of human behaviour is determined by genetic coding..

Kac: Yeah I certainly don’t subscribe to that notion ... 

David: But on the other hand, post-feminists like Butler would say that the very substance of our bodies is something only exists in our doing them as social entities, the whole doing of gender, the doing of being a male, the doing of being a female – the very substance of our physicality is socially determined.

Kac: Well one is a-political, the other is...
David: (laughter) is quite political, yes.

Kac: ...is primarily political. Well – there is no denying, of course, that one’s genetic heritage can’t be dismissed. I’m 6 feet tall, used to have curly hair, etc etc etc – these things of course they play a role in questions of identity, in questions of social interaction, etc – but are they the only factors? Of course not. I am very interested in Bhaktin’s notion of intersubjectivity where he says quite clearly that consciousness is not located inside or outside – it’s not social event or is not the sole domain of – I hesitate even to say ‘the brain’ because I absolutely despise these notions that locate consciousness on an organ. But he is clearly stating that that is not the case, that consciousness is intersubjective and it can only exist when there is social interaction, when there is dialogical forms of communication. And I subscribe to that idea, so what genetic determinists must ignore in order for their argument to be valid is environmental factors and of course when you say environmental factors you’re talking about physical factors – do I live in the jungle or do I live in the city? – is this polluted or is this not polluted – but you’re also talking about social pressures – do I live in an environment that is supportive, that encourages me to develop in a certain way, or do I live in a repressive regime that doesn’t allow me to develop certain potentialities or to explore certain aspects of the world which then encourage my mind to grow into domains of imagination that it wouldn’t otherwise? So the problem with models is that they can only claim to be models if they simplify the complexity of the events that they seek to describe, and these are models that we’re talking about, and in fact what you have is a very complex interplay of all these positions.

David: Thankyou, great – especially the Bhaktin thing, I’m glad you brought that up. So – the culture of mind of body, this is slightly lighter than the last two subjects.

Kac: The culture – are these dissertation chapters?

David: No, no, these are just three areas of interest.
'Frankenstein Foods', 'Terminator Seeds',

Kac: - which don’t exist anymore – terminator seeds –

David: sure – and 'Designer Babies' - these and other pithy tabloid summaries of the prospects for bioengineering and other experiments, all carry a certain scepticism. The corporate muscle of the multinational companies responsible for the development of the biotech industry, (and umbrella organisations like the WTO,) is inevitably more interested in profit than the personal or ecological welfare of its clients – despite the cynical 'feed the world' spin.

Kac: - yeah that's baloney, yeah

David: It is common knowledge in the sociology of technology that capitalism, the Protestant ethic, and the rapid development of technology all go hand in hand, in a cultural convergence unique in history. Now Judy DeMocker, in her article in Wired News about the Web98 event in San Francisco, quoted you as saying, with regard to Time Capsule, that you “chose the ankle because it has so much symbolism...[it]...is where human beings in the past have been branded and chained.”

Kac: - and still are believe it or not!

David: Sure.

Kac: In certain regions of the world, yes.

David: So, (this is quite blunt) are you:

(i) wholeheartedly against the modernist myth of progress that has brought us thus far,

(ii) acquiescent in the face of some technologically deterministic inevitability you want to alert us to and try to make the best of,
(iii) reflecting back to us through your work the potential nightmare of an all-too-near future we should be thinking seriously about before we take the plunge, or

(iv) something else entirely?

Kac: (laughter) I'm having a good time with your questions. You're probably the most well prepared person that I have encountered.

David: (laughter) Thankyou.

Kac: Let me review the options (takes question sheet to read) Well of course the positivists' notion of progress is problematic. Has our quality of life improved? Yeah I can take a plane, in a few hours I'm over here — that's a phenomenal event — as I heard an aviation expert mention the other day — you look at people at airports they're blasé about the fact that they're gonna hop on the airplane but don't be fooled by thinking that they are unaware of the extraordinary event they're about to become a part of, which is the ability in a few hours to transport themselves across the world. So one can't dismiss the incredible social transformations that technology's brought about, and of course I would not against that, and you know I don't wanna like ???? take us back to the 7th century, which is what they are trying to do. But should we do our business under the heading of progress, well that is again oversimplifying, because everything has multiple sides — I'm more interested in examining them all, and in my work I have created situations in which you are invited to look at things from different angles, because I want through that literal multiplicity of points of view suggest that we might consider these other points of view in order to step out of our own insular frame. So am I against the modernist myth of progress, yes, but in the positivist sense, of course I'm not against the improvement in the quality of life that it has brought, of course — quality of life for whom? And at what price? So all of this needs to be taken into consideration.

Acquiescent in the face of some technologically deterministic inevitability that I would like to alert us about? Well — if history serves as a lesson or example, when was is that the
Church finally pardoned Galileo, or acknowledged its shortcomings in accepting and understanding Galileo's contribution – very recently, wasn't it?

**David:** Very recently

**Kac:** Just one or two or three years maximum, ago wasn't it?

**David:** Yes, yes. The Virgin Mary didn't get to Heaven until the 1950s, I don't think. (Laughter)

**Kac:** The Church also in the very recent past finally acknowledged that the Jews did not crucify Christ – but this took almost 2000 years to take place. So what I'm saying by saying this is that in the case of Galileo because of the technological/scientific contribution, is that ideas do spread, and you would be foolish to think that science and technological development is going to come to a halt. We have the web, we think we're hip, but look 20 years down the line if you can – you're gonna see that the web of the future, or whatever this is going to evolve into is certainly going to look like something very different from what it does now. So that is just part of human nature. It seems like, as Dillan Flusser once pointed out, it seems like while the spider today weaves its web, in a way that is pretty much very similar to the way it did 1000 years ago, we don't. So our techniques, our tools, our way of thinking is bound to continuously change. So do I acknowledge that fact, yes. But I also acknowledge the fact that this change is not apolitical, it's not decontextualised, it comes at a price, it exists within a certain context, only, often... when it's taken out of another context it has different consequences, and of course in a McLuhanesque manner they both reveal and they enforce upon us new patterns of perception/congnition. And I think one of the great contributions that I can make is by the creation of situations – I'm interested in creating situations, not things – that try to reflect try to capture the cultural complexity, the cultural significance of these transformations. And reflecting back to us through your work the potential nightmare of an all-too-near future we should be thinking seriously about – erm – I do not want to take a cynical approach, by saying that it seems that not only governments but also civil
society has seen its free will or its sense of autonomy decreased in the presence of the mega-mergers that have occurred, but you have to consider the fact that the most recent mega-merger, what is it – MCI was bought by WorldCom, and then they bought Sprint. MCI laid the foundations of the Internet – every email you send goes through MCI-laid cables. And Sprint and MCI were competitors, and WorldCom bought them, so you’re seeing a decrease in choice progressively occurring in the mediascape, in this media environment that we live in. And of course these mergers have to be authorised by governments but the magnitude of these mergers and the capital that is involved exceeds by far the gross product of many developed nations. For example if WorldCom wanted to purchase Hungary, in theory it could. It would have the power to do so. Of course Hungary’s not for sale, but

David: Bill Gates could probably buy Hungary, personally...

Kac: So you have a sense there of the dimension of what many call this global economy which to me is just another phrase for a new form of what twenty years ago we used to call colonialism. And yes it’s true that you can be in touch with everyone, with everyone in your circle, form virtual communities etc, but at the same time, you are seeing colonial structures being preserved. So for me the post-colonial is not the overcoming of colonialism but it is a study of the current state of affairs after the initial imposition of the colonisation process. So it’s a study after the colonisation process not the condition of overcoming colonialism, for me, that’s the postcolonial study concept. So is there a nightmare ahead? I don’t know, I don’t if there’s a nightmare per se, that’s the term you’re using, but there are changes, and its human nature to resist the changes, and we resist changes because we are fearful of what we don’t know – it’s only a natural human response. What I am saying with my work is that I profoundly respect that fear, that concern, and I humbly submit that we might make better use of that concern, make better use of that fear, by not purely and simply blindly rejecting everything, we might make better use of that concern, of that fear, by study – by becoming involved, and participating in the dialogue. So my work is a big statement on
that. Recently there was a full page advertisement in the New York Times by a dozen organisations opposing genetic engineering - and let me make it very clear, my position is not either in favour, or against, and I know that people that are either in favour or against will demand that you take a position, but artists, I feel can investigate the complexity of the situation, and that is a position. I don't need to conform to the pre-given positions, positions determined by others, I am carving my own mode of being in this debate by saying that - and in this advertisement they made 3 basic claims that they use as hallmarks, as emblems, really, of their position - if memory serves me right, one was the mouse that had the ear upon it's back - you know that image - the second example was the BT killing the Monarch Butterflies - you know that too - and the third example was genetically modified foods that have no regulation that are being posed by companies etc - now they're all erroneous claims, they're all technically incorrect. Anybody that knows a little bit, and I've no PhD in molecular biology but I've been studying things very seriously - anybody with a minimum understanding of molecular biology anyone will know that the ground on which they stand to claim their opposition is fluid, is unstable, is shaky, they're standing on facts that don't exist, on misperceptions, misconceptions. That mouse has nothing to do with genetic engineering - the ear is not a human ear as they claim, the ear was inserted through surgical procedures, not grown as part of the animal or anything like that, and its objective is to give those who were born with congenital defects or who have lost their organs - their ears - in the course of accident or fire or what have you - to gain the opportunity to be able to grow an identical organ with their own cells. In the case of the BT for example, the press took a thread of the original report in which Monarch Butterfly larvae were force-fed in the laboratory the BT seed and a significant number of them died, but I enjoying my breakfast at the hotel I'm staying, now let me describe my breakfast to you. Two slices of bacon, two sausages, a fried egg, and refried beans. I enjoy it, it's cold but if I were force-fed that on a regular basis for breakfast, lunch and dinner, I would soon have my arteries clogged, which would lead to serious health complications. In the wild where Monarch Butterfly actually live, they're not force-fed BT products and in fact evidence
seems to prove once and for all that the main factor decreasing Monarch population is the increased appropriation of terrain and construction expansion of factories and houses and things that destroy their habit.

**David:** Habitat destruction.

**Kac:** Yeah that seems to be the number one factor in the decrease in population. So a new term is surfacing which they call "issue engineering" – it's somebody who is manufacturing an issue that simply does not exist. And so I think this is a problem – not because I am undermining the seriousness of the concern expressed by these groups – I share their concern! But it's not, this way – by contributing to misinformation, that you're going to effectively impart any change. And you'll say, well, you can't trust scientific data, perhaps not. But you can't purely and simply ignore the data as it presented by scientists, you have to look at it, even if it is only to undermine it. To disprove it – to reveal the lack of substantiation, to expose arbitrary elements in the scientific process, but you can't purely and simply dismiss or fabricate facts with contribute to undermining the cause you're trying to embrace. So I am trying to point these things out, through my work, by basically saying that we have to participate, we have to study, we have to understand, because it's only through that process that any significant change, not just casual change not just change in pose, like groups that are looking at profit and nothing else, only then significant change can take place – if you raise a new awareness a new consciousness about the true cultural impact of technology in general and biotechnology in particular in this case.

**David:** Splendid – a very full answer thankyou. So er 3 more questions. We have actually mentioned both of these people before so we could skip this one in fact. Other performance artists like Stelarc and Orlan are making statements in this area. What do you think of their work? You don't need to say any more, you've already said a fair amount. Er... Cyberpunk fiction has taken off since the early eighties. Writers such as Gibson (*Neuromancer*)
Kac: yeah

David: have been joined by others like Neil Stephenson (Snowcrash),

Kac: yeah


Kac: I'm not familiar with the last two.

David: Ok.

Kac: What's Pollen about?

David: Jeff Noon is a very strange character – it's bioengineering stuff – a bioengineering accident – very large quantities of very strange pollen land on the city and everybody changes.

Kac: Physically?

David: Yeah.

Kac: And then what?

David: It's a bit of a disaster really. Do you read these or other authors like them? What do you think? What about the cyberpunk movies, Terminator, RoboCop and so on? That element of culture and cyber.

Kac: Yeah y'know I've read Gibson and I've read Stephenson and yeah I enjoy it, but many of these ideas have in fact appeared elsewhere too – for example I enjoy also graphical novels – which are left out of the equation there
David: yeah – omitted by mistake – you’re quite right they should be there.

Kac: and... I managed to buy (you can’t find it in English I don’t think) a graphic novel written in the late 60s called El Eternauta – the one who navigates in eternity. Cosmonaut-like – eternauts. The artist in this case is Alberto Breccia, who was born in Uruguay but has developed his career out of Argentina – you can find his work certainly in France and Spain. And I’m this fascinating story about this man that for various reasons is confined to travel in time until the end, and he finds himself back in a certain century and there’s this whole thing – he’s in Buenos Aires... and basically the US has made a pact with the alien invaders – that they can have Buenos Aires if they leave the US alone. And so they come to Buenos Aires and they start to take it over and they convert people to telepresent cyborgs, they can remote control these human beings and have them do whatever they want, and this appears in the cyberpunk imaginary, so I was really shocked when I saw that because this is really early. So you have to go back – for example Robert Heinlein and his Waldo from the 40s in which he already fully anticipates the multiple implications of telepresence. So yeah – I read science fiction I read graphic novels, and yeah they’re probably part of my imaginary in some way or another. As a matter of fact in some cases for example in Neil Stephenson I actually borrow the metaphor from Snowcrash in my piece Rare Avis - I thought the idea was really fascinating that appears in Snowcrash that you log into the network into the metaverse and the wealthy they log on with these full-colour high-resolution avatars, and then you have the black and white people, and the colour people – and of course these words mean something altogether in that context –

David: Sure – but it is in a sense a reproduction of racism

Kac: right exactly – so in Rare Avis – are you familiar with the work?

David: I’m not actually familiar with that one
Kac: If you look on the web you’ll see it – there is senses in which one gains access – the event that is taking place – which I won’t describe because you can clearly see that - is the same, but these multiple instances or windows into it that you gain through the differentiated forms of access that I created for the piece – some are black and white, some are black and white with motion, some are in colour, some are in colour with greater resolution, and some allow everyone to see, some allow only certain people to see other people... so I borrowed and expanded upon it because I meant to reveal the existing forms of hierarchies on the Net according to different kinds of access to network topologies and hardware etc.

So to a certain degree yeah I’m not ignoring this work. I won’t say it has a primary place in my work but I’m not ignoring it.

David: OK – final question - One thing many cyberpunk writers seem to focus on is the fecundity of the blurring of boundaries between man and machine. J. G. Ballard’s Crash in particular focuses almost pornographically on the sexuality of the encroachment of technology into the body. Nymphomation is a favourite topic of Jeff Noon’s. Have you explored this at all?

Kac: What’s Nymphomation?

David: Nymphomation is a word that Jeff Noon uses

Kac: For?

David: Well, it’s a cross between information and nymphomania – the sexual fizz

Kac: Nymphomania has to do with women in particular

David: It does but he’s used it for a much more broad sexual fizz to do with information overload – people getting off on how much information they can get in.

(pause) As you’ve had blood boiling and on fire.... (laughter)
Kac: Well. There is no doubt that there is a sense of excitement in one's ability to stay connected and I have — I don't exactly when this happened, perhaps six months or so ago, perhaps longer I don't quite remember exactly — but not too long ago I finally got a cable modem at home which of course gave me a great deal of satisfaction because now it's no longer a matter of going online — I'm always online. There is no time when I'm not online, except perhaps when I'm sleeping but sometimes I even leave it online. I leave my email open... So when I'm at home I'm online, and I'm online in my office, and eventually we're gonna be online when we're between places as well because mobile large-bandwidth devices are being implemented - and is that a problem, is that something desirable? Well it's like one would say about television — I can always turn it off. I have a cellular phone which I never leave on — because my primary objective with my cellular phone is to talk to my wife. That's my number one objective — and I don't give the number out to anybody, nobody has my cellular number — and on the rare occasions that I have to give it for one reason or another, nobody would be able to reach me anyways because I always leave it off. When I know that I'm going to have a meeting, then my wife and I agree, and we leave them on for a certain period, and then we're able to reach each other, or of course when I need to make a call, I do. So the idea that again this constant connectivity would infringe on your privacy I think is ludicrous, because again — you can always turn it off, as I do. I'm not disturbed by the cellular telephone — as many complain - 'Oh it never stops ringing' — well turn it off! Don't give it out — it's a very simple thing. On the other hand I have a friend who has a family that is somewhat dispersed, within a certain geographic region but not in the immediate vicinity, so for her it's essential to leave it on all the time because that is how she's able to maintain reinforced personal relationships — so I think it's really a matter of how one chooses to implement it in one's life.

David: Did you see the movie, Crash?

Kac: Frankly, it didn't appeal to me.
David: No – it’s a light-hearted question....

Kac: I am way more fascinated by Marquis de Sade for example, Georges Bataille, you know, because in a sense this is his source. Roland Barthes reading of the Marquis de Sade’s work and the concept of the pornograph I find truly fascinating. Barthes fully understood the machine – not in the literal sense of the physical entity - but the machine that the writing of the Marquis de Sade creates – I wouldn’t say I read de Sade, I studied de Sade. (laughter)

David: I read him in the early 80s – and was fairly turned off, but it was something that I felt I had to do in order to be aware of it.

Kac: I studied de Sade extensively – I found it truly fascinating – but it’s interesting – apparently de Sade invited Voltaire to an orgy, and he went, and then de Sade invited him again, and he said, ‘Once, it’s philosophy, twice is perversion.’

(Laughter)

Kac: Blurring the boundaries between man and machine...

David: What would Sade have done with 120 Days of Sodom if there were so many gadgets to use, I wonder.

Kac: Well Passolini’s versions – Passolini made a movie – which is a contemporary version of 120 days – the blurring of man and machine – yeah this is indeed an uncomfortable scenario, because until recently it’s exactly where the machine ends that we start, or that we end and the machine starts – the differences are clear-cut, but when you start to think of the storage and the processing of information in machines as memory you see how deep that cybernetics has penetrated into society at large – Big Blue beating Kasparov still doesn’t make it a thinking machine, I personally do not believe that machines / computers will ever have consciousness – I’m in the camp that disagrees with ??? and others, who believe that computers one day will have
consciousness, because they foolishly identify the explanation of the electro-chemical signalling in neurons with this much more complex phenomenon, that frankly I don't believe one will ever explain. One can continuously try – just as in Art you create propositions that excite the imagination and open up perhaps things that are unforeseen, but it has to be done a little bit tongue in cheek with the understanding that you’re never gonna get there. But what matters is not that what matters is the voyage.

**David:** Sure. It's interesting you should say that though cause it takes me back to where we started with this holistic thing, about replacing – in a modular compartmentalised way, replacing bits of the body in order to keep people alive longer – if at some point we got to the stage where we could replace the entire body then we would have A.I. effectively.

**Kac:** You mean, including the brain – yeah then you’re making a robot – an android – a replicant.

*(David and Kac both talk at the same time.....)*

**Kac:** You’re talking about a full replacement and I’m assuming a full replacement would include consciousness.

**David:** Is it possible – you would suggest probably not.

**Kac:** No I do not believe that a machine will ever be conscious.

**David:** So it’s an interesting grey area.

**Kac:** Because – you can always unplug it. Now you might say what if that supposed machine consciousness would be embodied on an android that is stronger than you which would not allow you to unplug it.

**David:** Data for example.
Kac: Right. That is indeed an intriguing scenario, I just do not believe that it is going to happen. But we’re not going to be around to verify whether it’s going to happen or not. So. But the question of the blurring of the boundaries is indeed an interesting one. I’m not necessarily embracing the concept of post-human when I say this, but – because things change and they don’t, at the same time – but it is true that many of us have dental implants or pacemakers or bone replacements or screws in the ankle or microchips in the ankle or other things that for medical reasons most often than not we have to incorporate into our organism – does that make every person with a pacemaker a cyborg? Technically yes. There is a mechanism of feedback which helps regulate the organic part of the system but what does that really change?

David: A change in substance but not the whole picture.

Kac: It changes in minor ways – perhaps a person can’t be a basketball star.

David: But then without the pacemaker he’d have been dead anyway...

Kac: That’s my point. So I conclude my article, my paper, my manifesto on transgenic art by saying that in the future humans will be transgenic as well and that does not create an ontological crisis. It only means that the genome that we’re born with is not the final word, it’s just the starting point.

David: yeah I remember that section

Kac: And what do I mean that – it’s not a cyberpunk statement, it’s not a perceptual proposition, it’s like pretty much almost everything else I do – very matter-of-fact. I’m very matter-of-fact, very down-to-earth and very objective about my statements, I’m not a conceptual artist, I’m not working in the cyberpunk thing of provocation or dystopian visions. I’m very matter-of-fact. So what’s matter-of-fact about it is that just like I wrote my gene for Genesis on my word-processor, on my Macintosh, I
emailed that gene to the Company and I had it sent by courier in the mail in little vials – a very ordinary affair. So what I’m saying is that we are going to get to a point in which synthetic genes will be written and they will be incorporated into a human genome because there will be medical advantage to do that. One will be able to understand what one needs to write – what gene one needs to write, that will produce a protein, that will address perceived need. And that will then be incorporated and there’ll be individuals that are born perhaps with synthetic genes, which then operate functionally as a conventional gene would. And for medical reasons, one day – I don’t know if we’re gonna be alive when this happens, but it seems to me certain, that one day, for the same reason that one has a pacemaker today and as a result one is called a cyborg without any ontological crisis, of course you’re still a human being, for the same reason, we will one day be transgenic.

**David:** brilliant – well thanx very much it’s been an excellent conversation.
b. EHPA Conference Notes

Exoskeletons for Human Performance Augmentation

The conference was described as a 'Teaming Workshop'. Essentially, the morning sessions on each of the three days were given over to military personnel from the Army, Navy, Air Force and Marines, who gave presentations about what they were after, what their requirements were, and the afternoon sessions were given over to a series of 15min presentations by engineers and bio- mechanics from all over the US, describing the current state of their research. There was one buyer - Dr. Ephrahim Garcia, of DARPA, with $50m of DoD money in his pocket. The morning sessions were of great interest to me. The afternoon sessions, essentially, were not.

DARPA

In their own words:-

"The Defense Advanced Research Projects Agency (DARPA) is the central research and development organization for the US Department of the Defense. (DoD) It manages and directs selected basic and applied research and development projects for DoD, and pursues research and technology where risk and payoff are both very high and where success may provide dramatic advances for traditional military roles and missions and dual-use applications."

"The Defense Sciences Office (DSO) of the Defense Advanced Research Projects Agency (DARPA) is sponsoring an unclassified Teaming Workshop for a new DARPA program on Exoskeletons for Human Performance Augmentation (EHPA)."

"The Defense Advanced Research Projects Agency (DARPA) is soliciting innovative research proposals on Exoskeletons for Human Performance Augmentation
Exoskeletons for Human Performance Augmentation

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Army Combatant Needs and Requirements

Mr. Chris Kearns, Army, USAIC/DBBL. Ft Benning

At the beginning of the first morning, Mr. Kearns introduced the concept of a systems approach to the whole question of EHPA. He described to us the requirement for human-machine systems, for human-computer systems, for machine-computer systems, and how the exoskeleton and the soldier wearing it must be thought of as one system comprising these and other systems.

This concept had grown through the 1990s, following the development of the idea for an exoskeleton during the late 80s, and set down in a formal Army Science Board Report in 1991. So Mr. Kearns' presentation was entitled: "The Soldier as a System."

The integrated systems approach promotes an understanding of how changes in any one area of the soldier's requirements would affect one or more others. These requirements are labelled: Lethality - Command/Control - Survivability - Mobility - Sustainment - Training.

During the course of the 1990s then, this concept went through various stages of development, culminating in the late 1998 announcement of the LAND WARRIOR SYSTEM.

Mr Kearns pointed out that the fictional precursor to the Land Warrior was a book entitled "Starship Troopers", by Robert A. Heinlein, (see the movie website) which was well worth reading because the Land Warrior is already there in some respects, nearly there in others, and surpasses it in others. It is apparently much better than the recent film, and says a lot more about the battle armour.

Importantly, the Soldier System brings uniformity and standardisation (equalisation) to the infantry. It is something most other branches of the armed forces
already have, but which has eluded the infantry until now. The standardisation of human capabilities would mean that soldiers who were 5'10'' and 6'2'' could do the same.

The Army preferred term has been ECTOBIONICS, rather than exoskeleton.

An exoskeleton should be an outer skin that soldiers wear, not a new, small, individual platform that soldiers operate. The system must be independent so that soldiers can concentrate on shooting.

Ideally, it should weigh nothing, take up no space, and do everything. Get as near to that as possible!

The difference between weight and load was pointed out - actuators around the legs may enable a soldier to be carrying much greater weight than at present but feel a much smaller load.

Navy Corps Combatant Needs & Requirements

Mr. Al Hanneman, Navy, ONR

This was basically about what I would call 'telepresent' or networked-haptic-feedback applications for underwater operations.

Mr. Hanneman wants sailors in submarines to be able to operate external robotic devices with great accuracy and delicacy - for handling, say, nuclear missiles...

Most poignantly, as his last slide, he showed a picture (to general amused agreement) of the exoskeleton worn by Sigourney Weaver in the film "Aliens"

The consensus seems to be that this was like the future but much too bulky
Marine Corps Combatant Needs & Requirements

*Maj. Albert K. Dixon, III, MCSC*

Maj. Dixon's message to the conference was that the future of war is in the Urban Terrain. MOUT - military operations in the urban terrain - is the main area of future concern.

He cited Mogadishu, Grozny, and Northern Ireland as examples.

Interestingly, there was a lot of talk about British Army experience and expertise in MOUT, gained through the Troubles in Northern Ireland.

PM Soldier/Future Land Warrior

*Mr. Bill Brower, Ft Belvoir*

The Project Manager Soldier, or LAND WARRIOR was described by Mr. Brower more in the context of a squad than as an individual.

The Land Warrior is the integration of many sub-systems.

He demonstrated the software interface with Maps, satellite imagery, GPS details, etc etc and the handheld flatpanel display for all this information. He spoke of the need for a helmet mounted flip-down screen, and the load-problems of such a device on the neck: answer: exoskeleton!
He described the wireless LAN with internet based control from behind, with monitors for all systems including human physical monitors relaying information to command base at all times.

Mr Brower noted that pilots in the airforce don't like to be monitored physically because they are prone to black out in high G situations and like to keep it quiet. He said there was some ongoing research into the psychological problems needing to be addressed regarding physiological monitoring, at Ft Belvoir.

Mr. Brower was at pains to point out that the haptic interface is of equal importance to the technical solution, that the melding of machine and soldier together was paramount.

Very interestingly, a polite disagreement broke out amongst the audience during the questions after this presentation, between a gentleman in military uniform and another in civilian clothing who was clearly a defense official.

The need for specific preparation of the individual to become a part of a Land Warrior system was pointed out by the military man.

He felt that problems regarding 'cognitive overload' - too much info - might hamper the ability to fight, and increase the physiological stress.

The upshot of the argument was that there was no real research on potential identity problems when a human being becomes part of a human/machine system.

It was acknowledged that unique training requirements need to be addressed - how does a human being remain more than 50% of the system?

It was warned that the average soldier has an IQ of 100 - which means that 50% are at or below 100.
It was pointed out that kids growing up today are all using computers and video games all the time, and that this constitutes excellent training to become part of a Land Warrior system.

Combat Experiences in Saigon

Special Guest Speaker: John Harrison Esq.

Mr Harrison reminded everyone that, historically, frontline troops take the 'stuff' OFF, when going into actual combat.

So much for the land warrior system.....

Retelling anecdotes about the reality of 19 year old foot soldiers, he warned that "the more information you give [a soldier] about the guy he is about to kill the less likely he is to do it."

Special Operations Needs and Requirements

Peter Paicopolis, SOCOM, Aberdeen Proving Ground

Special forces would be the most adaptable vis-à-vis an exoskeleton system.

The concept of Metabolic Cost.

He suggested a mid-term goal might be to create an 'unmanned' exoskeleton controlled at a distance by a soldier with an "I-Port" (whatever one of those is), and that a fully manned exoskeleton might be a long-term goal.
Special Operations Forces (SOF) wanted an exoskeleton system back in the early 90s but had no money for it. Now DARPA is leading the program SOF are happy.

SOF carry 170lbs of kit. Most interested in exoskeleton system that carries that weight for them.

A discussion followed regarding the difference between exoskeleton modularity, (bolt on and off bits for special environments that make the system context dependent,) versus a human augmentation approach, where the system is designed regardless of potential context.

Kearns felt it was important to enhance the human, "don't give him another thing to operate."

Exoskeleton Operational Concepts: Lessons from Future Wargames

Dr. Michael Vickers, Center for Strategic and Budgetary Assessment

Future Warfare 20XX - a program of wargames with players taken from the elite of the various armed orces.

Based on the FutureWar program undertaken in 1993 to look at 2025.

The awareness and connectivity, and the precision and miniaturisation requirements isolated in 1993 are now already available. We have the ability to reach out and touch with great precision.

Dr. Vickers talked about Military Revolutions

Napoleon

Air power
Nuclear

Most significantly the Railroad-Rifle-Telegraph revolution in the 19th century.

Current Military Revolution is unmanned aerial force and exoskeleton soldiers.

Main feature is Speed: power projection with missiles, and information strikes at the speed of light.

The Future Warfare 20XX games series involved a hypothetical 'large peer competitor' - basically China - called the Siberian Republic, and entailed a five year long series of games between UD field operators.

The Games threw up the following priorities: Desired exoskeleton attributes:

1. Mobility - strategic, operational and tactical

2. Strength, speed, endurance, STEALTH

3. SKIN rather than Sigourney Weaver machine

4. Information Protection more important than Ballistic Protection

15 yr old girl anecdote - read "Starship Troopers" aged 10, wants to be an exoskeleton regiment commander when she grows up. Look out large peer competitor.

Mention of 'Predator' - type stealth and reduction of 'signature' as preferable to Sigourney Weaver machine.

Comments afterwards included the often repeated demand for TRAINING and that it needs investment as a well as the new technology.

There should be no de-coupling of the human and technological
In the games, it transpires, the concept of robotic/human coupling was clearly preferred to any form of bio-enhancement for soldiers. You can leave your exoskeleton at the base when you go off-duty.

Bio-enhanced troops getting drunk and smashing up the bar off-duty didn't appeal.

Players in the games used exoskeleton regiments as discrete SOF - they had 5000 such troops out of a total of 300,000, but they were the Most USED.

As the games unfolded the trend was clear - towards greater use of SOF infantry in exoskeletons with unmanned robotic support.

**Moving By Thinking: Towards a Cortical Neural Prosthetic**

*K. Shenoy, D. Meeker, R. Anderson, H. Sherberger, B. Pesaran, S. Cao, J. Burdick, California Institute of Technology.*

**Monkey experiments**

**Cortical control signals**

Motor cortex- problems, so: higher up the cognitive chain to where motion plans are first formed

**Using Utah Array, implanted in monkeys brains**

The direction of reach, when the monkey extends his arm whilst playing a video game with food rewards, can be determined by reading the firing activity of the neurons.

The background 'buzz' in the brain, picked up by the sensor array, is only there when there is info, but shuts down when the movement begins.
A good 200 milliseconds of reaction time can be eliminated by these means.

Unfortunately, invasive surgery is still needed.

There is general laughter at the unacceptability of such invasive surgery to the military.

A hope for a new scanning technique to obviate such a need is expressed.

The information regarding these experiments is not included on the CalTech website because of Animal Rights groups' opposition to invasive brain surgery on monkeys.

Special Guest Speaker: Mr. George Solhan, ONR

(Retired LTC, Marine Corps)

Mr Solhan stressed the importance of camaraderie: "Men fight for their buddy, not for national goals."

"Intimacy with the terrain is very important to being a warrior" - exoskeleton mustn't diminish this.

"The Predator, in the movie, takes off his exoskeleton to go mano-e-mano with Schwarzenegger, at the end - probably for good reasons."

The pure aspects of battle are: your friends, your weapon.
Special Guest Speaker: MSgt Tim Wilkinson, Air Force

MSgt Tim Wilkinson showed us an internal video report on the operation in Mogadishu, focusing on the loss of the helicopter, and the subsequent rescue in which he took part.

The implications for such helicopter operations (MOUT), in terms of the protection of the SOF that undertake such operations, that exoskeletons represent, is something greatly to be valued.

Rescue team, though they love their work, ultimately WANT to be out of a job.

Human-Machine Interaction Issues in Human Performance

Augmentation

*John V. Draper, Oak Ridge National Laboratory*

EHPA requires a greater degree of human-machine integration than VR or telerobotics.

Anthropometry and Biomechanics - fitting the machine to the soldier and the way he moves

Ease of use and comfort

Importance of situation awareness

Safety aspects

ORNL developing integrated human-robotic systems
Human Science Modelling

Dr. Louis Piscitelle, Army, Natick Soldier Center

A discussion, largely, about load problems

Thoughts arising:

Metabolic/Muscular-skeletal stress is the focus of this presentation - joint angles etc.

The human/soldier is an organic machine, which balances and accommodates loads.

This is a scientific/non-sociological community looking at warriors as intelligent, decision-making machines.

Only a few of the (experienced) soldiers here keep bringing up the HUMAN factor, and sound like Luddites in this company.

Exoskeletons for Human Performance Augmentation Program

Dr. Ephraim Garcia, DARPA/DSO
The program is set-up to develop the enabling technology to build an exoskeleton.

The exoskeleton should be like a bicycle going downhill...

The aim is to change the way the military do things by giving them enhanced capabilities.

Dr. Garcia’s diagram of his Integrated Design approach:

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  Structure

  Power  Actuation

  Control  Bio-mechanics
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"We're not going to embed chips in anyone's brain, at least" - though neuro-mechanical responses using non-invasive techniques would be welcomed.

Garcia jokes about people who already believe they have chips in their brains - "maybe it won't be that hard to sell" after all - general laughter.

Progress "not with skin-penetrating electrodes" - but with neuro-mechanical communication through external sensors.

No-one wants to see American soldiers on enemy vivisection tables.

"When we bring the human into the loop" - it has to look cool, it has to have a feel-good factor - "this is neat, give me one" is the reaction we want.

2002, 03, 04 big development years
2005 onward - looking to see results: full exoskeletons.

"I'm not interested in building robots. What we do will affect robotics in the future, but I'm not interested in androids." Dr. Garcia

Evening conversation with Dr. Garcia

Catching Dr. Garcia for a moment's conversation, one evening, I asked him about the potential psychosocial problems of the land warrior system.

In reply, he said he believed the potential "mind-set" problems of becoming part of a human-machine system may be a factor narrowing the use of such systems to highly trained shock troops rather than wider issue to all military personnel.

He believes it is the 'time' for this technology. As a purchaser of advanced technological research for the government, he is concerned to see if it works, first, if the military will buy it, second, and only then, through pilot studies, begin to address socio-psychological factors.

Thoughts Arising from the Conference

My research is akin to a Risk Assessment, aimed at the 21st century 'Human as a System' - to discover problems on the human side of the haptic interface.

Ectobionics, once developed for the military, will soon spread into industry (oil exploration, chemical industry etc) and the games/entertainment market.

Issues of uniformity and standardisation have a Baudrillardian rationalisation feel.

Psychological stress and ill-preparedness/training implications seem important but without focus compared to the technological implications.
The potential loss of integrity in systems larger than the self-as-a-body; the self-as-a-body being larger than that bounded by the skin.

Metabolic Cost concept - the search for ways of isolating the individual from the ACTUAL environment and encasing the individual in and IDEAL/VIRTUAL environment for optimal performance.

Optimal performance on a scale which disregards engagement with the ACTUAL environment in the ways of the native hunter...

Hollywood movies, ALIENS and PREDATOR are benchmark ideas for this conference. DARPA are trying to bring them into reality. They are the language by which the military communicate with the scientists.

Cyberculture is here!
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