Do It Yourself Future Construction:
The Deregulated Self

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Declaration

I certify that except where due acknowledgement has been made, the work is that of the author alone; the work has not been submitted previously, in whole or in part, to qualify for any other academic award; the content of the thesis is the result of work which has been carried out since the official commencement date of the approved research program; and, any additional work, paid or unpaid, carried out by a third party is acknowledged.

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Abstract

This thesis explores the convergence of four different 'bios' (biology, biopolicy, biotechnology and the biosphere) and the way their imminent and accelerating interaction results in a closed system model of biospheric entropy generation *par excellence*. By highlighting the nature of these convergences I seek to explore ways of negating and/or reversing this oxymoronic, 'end driven' terminal logic, using generative approaches to "futuring" (Fry, 2009a) from contemporary art and design. I build on these approaches by targeting, as contemporary biopolitical interventions do, the individual 'self' as the most salient agent capable of making transformative change. In this capacity I suggest that the soundest means to 'construct' the future ("where it can no longer be assumed that we, *en masse*, have a future" (Fry, 2009a: 1)) is via the 'deregulation' of the self.

Institutional and ideological deregulation will enable the species to spontaneously self-organise and (re) 'construct', albeit differently, the emergent conditions for life. By facilitating the exploration of idiosyncrasy and creativity to the *nth degree*, deregulation cultivates difference, diversity and unpredictability, qualities herein identified as key antidotes to biospheric entropy. The rise of 'Do It Yourself' (DIY) cultures – in particular the advent of DIY synthetic biology – are the driving inspirations behind this hypothesis, with the core claim being that the individual artist (the deregulated self) is the best equipped to exploit such DIY cultures to the collective advantage of the species; that is, toward the construction of a "futuring" condition.

Chapter 1: Introduction

Biopolitically, ageing 'Baby Boomer' populations, those born between 1946 and 1964, translate as "problems" (Powell and Wahidin, 2007: xx) in Western developed countries. Their imminent retirement reduces the size and expertise of the labour force by as much as 40% (Lefkow, 2005) while their inevitable progression toward further debilitation and senescent decline demands greater access to critical resources in the form of ageing infrastructure and aged care services. Referred to in the popular media as an 'age quake', a 'silver tsunami' or 'boomergeddon', ageing populations threaten to diminish living standards and social security provisions in most developed countries (The World Bank, 1994; The World Health Organization, 1999). Contrary to this argument exists the possibility that the single greatest consumer demographic to have ever lived will defy all predetermined expectation and maintain their position as the evolutionary avant-garde of the species, living longer and healthier through the emergence of what I call 'immortalist biopolitics'.

As much as Baby Boomers themselves are intent on maintaining their youthful vigour and continuing to matter, the notable increase in optimism towards the aged and the ageing experience in recent times (Powell and Wahidin, 2007) is driven as much by political and economic interest as it is by Boomers themselves. At the insistence of The World Bank and The World Health Organization (1994; 1999), neo-liberal countries have in recent years consistently nominated the goal of 'healthy' and 'productive' ageing as one of their key policy priorities. At the same time these countries have incorporated 'risk management' procedures that displace the burden of aged care back onto ageing individuals themselves, achieved through providing incentives to stay in the workforce longer, and through the implementation of the biomedical model of 'self care'. Under the model of self care, ageing individuals become responsible for the maintenance of their own 'encouraged' health and well-being by employing the technologies and therapies of an emergent 'anti-ageing' industry (Waldby, 2005; Neilson, 2006).

A relatively recent addition to the Western biopolitical apparatus (biopolitics being the term coined by Michel Foucault (2008) to describe how governments seek to optimise and maximise the lives of populations for the purposes of creating stronger armies, economies and nation states), the anti-ageing industry is comprised of private entrepreneurial interests who provide products and therapies to service the needs and wants of ageing populations, with a view to *preserving* their longevity in the interests of maintaining a lucrative market base. Looming within this biopolitical matrix is the elephant in the room: "nascent" (Nielson, 2006: 153) genetic and molecular technologies that offer the potential for significant somatic and cognitive re-generation (Waldby, 2005). These technologies, dependent upon a market for their development and proliferation, find their perfect complementary partner in the disproportionate number of aged and ailing persons in Western developed countries that stand to benefit significantly from such technological developments. In this context Nicolas Rose argues that "the laboratory and the factory are already intrinsically interlinked", suggesting that biopolitics is now a practice of "bioeconomics ... driven by the search for what Catherine Waldby has termed 'biovalue': the production of a surplus out of vitality itself" (Waldby, 2000: 19) (Rose, 2001: 15).

Moves to generate a "surplus" from ageing populations are now ubiquitous, from the exponential growth in the anti-ageing industry (Smith and Clurman, 2007) to the establishment of the American Academy of Anti-Ageing Medicine (A4M) and the formation of rights to life *extension* organisations (Rose, 2001: 17; Canton, 2008: 125). The speculative argument that forms the basis of this thesis is that, contrary to the traditional gerontology formula of ageing understood in terms of maturation, incapacitation and eventual senescent decline – "declineoldageanddeath" (Gullette, 1997: 8) – the biopolitical mandate of the 21st century instead champions an 'immortalist biopolitics', one in which ageing, even death itself – to cite Aubrey de Grey (2005), is a figurative, mutable horizon. Such an endeavour represents the quintessential expression, I argue, of 'unlimited' economic growth. However, as Foucault originally argued, contemporary biopolitics is a process that seeks to 'optimise' and 'maximise' the lives of populations (1986), and in this context, it encounters one critically complicating biopolitical factor – how to optimise and maximise the lives of exponentially increasing, 'aspirational' world populations (led by the resource-intensive Boomer demographic) in light of evidence that suggests there is a diminishing biospheric context in which to develop or immortalise into.

In 1800, the Earth supported a population of approximately 1 billion people. It took well over 100 years of industrialisation before that population doubled to 2 billion. *Less* than 100 years since then, the world's population has tripled to reach over 7 billion (US Census Bureau, 2011), and is set to reach 9.2 billion by 2050 (United Nations, 2008). In the next 50 years the world will have to produce as much food as it has ever produced (since agriculture first began with the ancient Egyptians 8,000 years ago) to feed this growing population (Clark, 2009). Critically, over the coming 10-30 years it is anticipated that the key non-renewable resources upon which our burgeoning population relies, which it is literally the *product* of, will run out. Oil and phosphorous have peaked or will peak (peak being the maximum point of extraction) somewhere between 2001 and 2020 (Heinberg, 2007; Peak Oil Taskforce, 2011). Without these resources mass production crops, the major source of food supply for the world's exponentially growing population, will not be possible. That no foreseeable 'alternative' energy source, such as hydrogen, is at all capable of replacing the oil based economy (Kunstler, 2005: 110) only further exacerbates this issue.

Overpopulation and resource depletion have a compound effect on each other, yet are eclipsed by a significantly more drastic biospheric event that emerges from them, that being 'climate change'. Though the Intergovernmental Panel on Climate Change (IPCC) deems a 2 degree mean increase in global temperature the threshold before what is popularly understood as 'catastrophic climate change' (IPCC, 2007), many scientists argue that this figure underestimates initial temperature increase as a catalyst to a broader chain of events that will swiftly take the mean global temperature much higher (Jaeger and Jaeger, 2010). As more data appears on rates of glacier and ice cap recession, permafrost melt and ocean acidification, and the escalating frequency and severity of 'natural' disasters, the evidence unanimously suggests these processes are accelerating, and accelerating faster than at first thought (Synthesis Report, 2009; Gore, 2009; Garnaut Review, 2011). Despite scepticism that climate science is confabulatory and inflammatory, rates of species extinction, of which global warming is a key contributing factor, suggest otherwise:

> *Of the Earth's estimated 10 million species, 300,000 have vanished in the past fifty years. Each year, 3,000 to 30,000 species become extinct, an all time high for the last 65 million years. Within one hundred years, between one-third and two-thirds of all birds, animals, plants, and other species will be lost* (World Watch, 1997: 7).

So sensitive is the biosphere to anthropogenic influence that small changes in one domain affect the interconnected networks of the Earth's ecology in ways we can only begin to fathom let alone manage biopolitically. Contrary to the hyperbole of transhumanists that proclaim the species is on the cusp of a technological "singularity" (Kurzweil, 2005) or 'omega point' that will greatly increase human life expectancy, or even signal the advent of immortality (De Grey, 2005), it is possible to view this anticipated culmination from the opposing spectrum. Here an exponentially warming planet can constitute a temperature singularity, what environmentalists refer to as an "ecological omega point" where "the vast interconnected networks of the Earth's ecologies are so weakened that human existence is no longer possible" (Kunstler, 2005: 8).

The need to generate what I term 'biospheric biopolitics' thus severely problematises the trajectories of immortalist biopolitics, counter-productive as it is to the biopolitical mandate to 'optimise' and 'maximise' life. It creates what I call a 'biopolitical paradox', the collision of two violently incommensurate biopolitical aims. I situate my endeavours at this seemingly impossible impasse in order to theorise ways that might initiate a transformation capable of suturing the terminal trajectories of this paradox. Due to the inertia, inability or outright refusal of institutional frameworks to adapt to the changing coordinates upon which their existence is predicated, I choose to concentrate here on the epistemological and ontological site of the individual as the most readily accessible and malleable agent for instantiating transformative change. This involves examining the potential for a reconfiguration of the biopolitical self not as an agent of 'self care', as is its current biomedical (biopolitical) incarnation, rather as a self that practices the 'care of the self'; that extends a co-extensive relation of care both to others and to the environment in which they are all situated and inextricably interconnected in a symbiotic, life sustaining web. Using the 'generative' approaches of leading theorists and practitioners from contemporary art and design, I seek to instantiate this 'caring self' by exploring novel, alternative and 'indirect' ways of changing cultural behaviour, proposing that what they point toward, and ultimately what is required, is a 'deregulation' of the self.

The deregulated self, one freed from institutional and ideological constraint to explore its own individual idiosyncrasy and creativity to the *nth degree*, is, I argue, the most salient means of creating the conditions ripe for a life sustaining emergence capable of countering the omnipresent entropy that pervades our biosphere. As noted above in the example of shifting biopolitical 'self-care' to the 'care of the self', my aim is to intersect existing cultural developments and momentums with the hope of being able to "redirect" them toward what Professor of design Tony Fry calls "futuring" (2009a) 'ends' (sic) – that is, acting in ways that actively promote future construction. In this way the deregulated self seeks to augment and amplify existing forms of deregulation and the concomitant open source 'Do It Yourself' cultures that have emerged from them. I argue that the promotion of such cultures are essential to making the swift and transformative changes necessary to negate the entropic trajectories of our species.

The culminating argument of this thesis is that deregulation reaches its quintessential (and most potent) expression, through the practice of open source 'Do It Yourself' (DIY) synthetic biology. DIY synthetic biology's capacity to repopulate the Earth with a life sustaining biodiversity (Kac, 1998) is the foundation of the deregulated self hypothesis, and the possibility for it to produce an emergent, transformative culture of future construction.

I stress that the deregulated self is not designed as a wholesale way of getting rid of 'top down' institutional structures, rather, it is a strategy to overcome the limitations imposed by them in the interests of swiftly and effectively creating the conditions ripe for life sustaining transformational change from the 'bottom up'. Though the deregulated self is a controversial proposal, the argument of this thesis is that the consequences of *not* indulging such a possibility (in light of the many and varied wildly speculative possibilities to be illustrated herein), justifies its inclusion in the pantheon of controversial proposals all claiming to have 'the' solution – in one way or another – to the biospheric crisis we have collectively created for ourselves. Given the current state of affairs and the consequences of inaction or, worse, getting the solution/s wrong, I have chosen to explore a nonsensical, yet for that very reason salient path toward the negation of what is essentially a nonsensical situation. To do this however involves taking a leap, and in doing so I invite you the reader to take this leap with me. I do not claim to have 'the' solution *per se*, nor demand that this is the only way toward generating a futuring condition. What I do strongly suggest however, is that the indulgence of such radical, often contradictory approaches to future construction are vital to constructing the diversity and complexity required to negate the forces of monoculture and its side effect: total and terminal biospheric entropy.

Overview of Thesis

This thesis is arranged into nine chapters that chronologise the development of the core argument from its initial biopolitical observations to its fruition as a potential mode of biopolitical action. The chapters each confine themselves to specific disciplines or areas of expertise, however these disciplines and themes bleed into and out of each other, demanding the reader indulge the practice of "coordinology", which is artists cum architects Gins and Arakawa's method of sequencing actions and holding multiple scales of attention at once (2002: 63). Coordinology is the methodology used to construct the arguments of this thesis, exemplifying the 'practice as research' (another Arakawa and Gins concept) theme prominent throughout this thesis.

Chapter 2: From Big Bang to Baby Boom

This chapter introduces the biopolitical catalyst for this argument, that ageing populations in Western developed countries, in particular the post WWII 'Baby Boom' generation, are set to transform ageing and aged experience as they have transformed every other dimension of their lives over the past 65 years. With an attitude of unlimited prosperity, perpetual youthfulness and the confidence of being the single most influential generation in human history, Boomers – used to getting what they want – are taking full advantage of an ever-emerging, 'anti-ageing' culture and industry that promises cures and treatments for all their ageing ailments. As change agents *par excellence*, research reveals that Boomers will redefine the

economic role of the aged by avoiding retirement and continuing to participate in society as much as possible. In this sense Boomers are refiguring the 'third age' of life (there are four life stages, the third being the most productive (Laslett, 1996)), by stretching the duration of that life category indefinitely. In this sense Boomers are singlehandedly causing a revision in the discipline of gerontology, countering the traditional ageing narrative of "declineoldageanddeath" (Gullette, 1997: 8) with a more Foucauldian 'relativist' approach to ageing. The key point made in this chapter is that as far as Boomers and the charter of contemporary biopolitics are concerned, the 'expectancies' of later life are increasingly becoming a site of malleability and contestability.

Chapter 3: Biopower and Biopolitics

This chapter offers a brief introduction to the terms 'biopower' and 'biopolitics' as originally described by French social historian Michel Foucault. I first detail Foucault's conception of these terms then analyse how they translate in the 21st century context. I employ these terms primarily as a means toward the interpretation of the profound developments in the life sciences, from in vitro fertilisation to genomics, and in more recent times Embryonic Stem Cell technology. Using Nikolas Rose's seminal schema for biopolitics in the 21st century, *The Politics of Life Itself* (2001), I then describe how contemporary biopolitics is shaped by the three key developments identified by Rose, they being 'risk', 'molecularisation' and 'ethopolitics'. This chapter establishes the theoretical foundation for how the ageing of the Boomer demographic challenges existing biopolitical analysis and practice, in particular the discipline of 'gerontology'.

Chapter 4: The Biopolitics of Ageing

Following on from the foundations of biopower and biopolitics explained in Chapter 3, Chapter 4 seeks to understand how aged and ageing cultures in Western developed countries translate in the 21st century biopolitical context. I do this in order to 'pre-empt' (pre-emption itself being a biopolitical 'risk management' procedure) how ageing culture is set to shape biopolitics, and what biopolitics is doing in turn to shape aged and ageing culture. Using Rose's three pronged schema for understanding biopolitics in the 21st century – risk, molecularisation and ethopolitics – I extrapolate these developments onto ageing culture, arguing that it produces an emergent condition I coin 'immortalist biopolitics'. Here biopolitically 'risky' ageing populations in Western developed countries threaten the greater biopolis, first by their mass retirement from the workforce, and second by the increased cost of care and resource dependencies of them as they age. At the advice of the World Bank and the World Health Organisation (1994; 1999), nation states have sought to relinquish the responsibility or 'risk' of ageing populations by increasingly privatising health so that the onus of responsibility is displaced from the state back onto the biopolitical 'citizen' itself. This process is administered through the requirement of ageing populations to subscribe to the biomedical model of 'self care', whereby the 'citizen' is left to manage their own health and well being using the procedures, applications and therapies of an 'anti-ageing' free market, the designated compensatory mechanism for the state's withdrawal of health provision in this context. Under such a model ageing populations are increasingly the subject of biopolitical discourses that understand ageing not as a natural, inevitable decline, but a 'disease' to be cured.

This, combined with what Rose calls "ethopolitics" or the rights of a consumer group (2001: 19) that see the aged increasingly demanding access to such anti-ageing goods and services, creates the emergent condition I identify as 'immortalist biopolitics'. Such a biopolitical trajectory is severely problematised however, when confronted with another key biopolitical issue, the 'biopolitics of the biosphere', the subject of Chapter 5.

Chapter 5: The Biopolitics of the Biosphere

This chapter demonstrates how the trajectories of immortalist biopolitics exacerbate a more significant biopolitical demand than ageing populations, what I call the 'biopolitics of the biosphere'. Represented by the four key problem areas of overpopulation, resource depletion, global warming and species extinction, I present each sub category separately, making the argument that a forthcoming (as yet nascent) biopolitics of the biosphere severely problematises the trajectories of immortalist biopolitics – given their contradictory aims that produce a 'biopolitical paradox'. This shift in register signals the arrival of the dominant protagonist in this thesis: the swift and terminal degradation of the conditions for (primarily, but not limited to human) life on Earth. In acknowledgement of the severity of this claim, this thesis dedicates itself to exploring avenues toward negating this. I do this first by analysing the status quo regarding the as yet nascent biopolitics of the biosphere as it is principally articulated through the 'sustainability' discourse, industry and movement. I critique the underlying problems of sustainability as 'the' solution to these problems given its adherence to the fiction of the 'natural' that I argue renders its best intentions ultimately futile. In looking to overcome these limitations I frame the biospheric problems of overpopulation, resource depletion, global warming and species extinction in terms of the 2nd law of thermodynamics, entropy. Chapter 5 establishes the severity of the biospheric issues that we face, the inadequacy of our present biopolitical trajectories to address them, and the necessity to seek other methods, practices and procedures for engaging with them, the subject of Chapter 6.

Chapter 6: The Artist as Agent of Future Construction

Given the failure of 'top down' institutional and governmental approaches to make the necessary swift, transformative changes required, I choose to concentrate instead on the site of the individual as a powerful and underestimated agent of 'bottom up' future construction. First examining 'generative' projects that seek alternative pathways to 'sustainability' – the *Design Futuring* of Tony Fry (2009a), the ethico aesthetic practice and pedagogy of Pia Ednie-Brown, and the entangled complexity of world construction practiced by the peripatetic design collective Spurse – I foreground the central argument of the thesis: that in order to overcome the biopolitical paradox and create a "futuring" (Fry, 2009a) condition, a more than equal and opposite resurgence of life sustaining properties is required. I argue that this is enabled though the adherence to a process of open loop emergence that, contrary to closed loop sustainability discourse, is activated by 'deregulating' individuals from the corporeal, ideological, and etymological constraints that hinder their collective ability to act as change-making agents in the world. Biopolitically, this argument is supported by sociologist Stuart Murray's re-examination of Michel Foucault's mining of the concept of the ancient Greek 'care of the self'. Murray linguistically shifts the parameters of the biomedical (biopolitical) model of self care, imbuing it with a co-

extensive relation of care that is in essence a caring for 'others', both human and non-human, to which the self is inextricably connected. This expanded sense of the self can be attained, I suggest, by deregulating the self from the institutional and organisational regimes that limit the ability of individuals to act in this regard. A deregulated, distributed self naturally expands the narrow focus of the monocultural self with the recognition of the osmotic symbiosis of itself with all that surrounds it.

This chapter concludes with a critique of Tony Fry's most recent book, *Design as Politics* (2011) as an example of, I argue, what *not* to do in this 'futuring' context. Fry's totalitarian and fundamentalist call for a "dictatorship of sustainment" (2011: 123-4), a call that is furthermore distinctly anti-technology in tone and trajectory (2011: 56), fails to take account of the contexts and momentums it aims to "redirect" (Fry, 2009a: 11). This critique establishes the argument of the following two chapters: that a deregulated self, one increasingly freed from institutional structures, both tangible and intangible, to exploit its idiosyncrasy and creativity to the *nth degree*, is the most salient means available to engineer a bottom up condition of future emergence. The deregulated self hypothesis is principally informed by the generative approaches or 'procedures' of the reversible destiny project of artists cum architects, Arakawa and Gins.

Chapter 7: The Reversible Destiny Project

Through an examination of the synergies between Arakawa and Gins' artistic and architectural project and the revolutionary findings in the discipline of cognitive science (Varela, Thomson & Rosch, 1991), I identify the reversible destiny project as one capable of accelerating individual transformation as an embodied, architecturally embedded potential. Using this synergy as a template for understanding how Gins and Arakawa's project both resonates with, and informs, the deregulated self hypothesis, I appropriate their manifesto *Architectural Body* (2002) and "redirect" (Fry, 2009a: 11) it in ways not originally intended by its authors. The core purpose of this redirection lies in the differing trajectories or modes of transformation we seek to instantiate: Arakawa and Gins – a project of reversing 'mortal' destiny; mine – reversing the entropic destiny of the species as a result of the irreparably compromised biosphere. The deregulated self hypothesis, a mutation of Arakawa and Gins' "organism that persons" (2002), is argued herein as the primary means through which the cultivation of idiosyncrasy, difference, and creative potential – essential ingredients to negating the omnipotent force of anthropogenically generated biospheric entropy – can be made manifest. As Gins and Arakawa state:

> *What is preventing us from inventing ourselves further? The answer comes quickly; the species has not yet learned how to have its members pull together at the same time as they continue to form themselves as separate individuals* (Gins and Arakawa, 2002: xi).

Gins and Arakawa's concept of coordinology is central to the operations of deregulation, for as a heuristic device it aids in the navigation of uncertainty and experimentation as an open ended process ("The coordinating of several scales of action makes a person able to construct a world" (2002: 63)) vital to the construction of a future without a teleological 'end'.

Chapter 8: The Deregulated Self

This chapter explains what the deregulated self is and how I anticipate it can be brought to fruition. First I establish that deregulation is not new, that it has arrived over the past three decades via two distinct streams: top down deregulation, produced by governments and other institutional bodies relinquishing control over financial markets, trade and other forms of state service provision such as the biomedical model of 'self care', the subject of Chapters 3 and 4; and bottom up deregulation, made available via the web-driven, '2.0' user friendly information technology revolution. The latter has seen open source forms of power that were previously the exclusive domain of institutional and regulatory bodies, empowering individuals to construct the conditions of life as a 'Do It Yourself' phenomenon. The argument of this thesis is to accelerate these processes of deregulation, for as Gins and Arakawa suggest, we as a society can only pull together (construct a futuring condition) by forming as "separate [deregulated] individuals" (2002: xi). While I acknowledge that deregulation is a vague, imprecise and largely speculative endeavour, I argue that is a salient hypothesis when situated within the context of the recent advances in the life sciences, namely 'synthetic biology' and the 'DIY bio' movement synonymous with it.

Synthetic biology builds on genetic engineering by designing and constructing new biological functions and systems not found in nature using artificial molecules to reproduce emergent behaviour that is found in nature. Like the information technology revolution that preceded it (indeed, that synthetic biologists use as a template or mythology for what it is they are doing), synthetic biology is itself already largely a 'deregulated' practice, with key members of the synthetic biology community actively promoting it as an activity to be done cheaply by anyone in the home or garage. In this context, 'DIY bio' as an emergent, potently 'futuring' *technē*, is central to the deregulated self hypothesis. The art of 'art'ificially constructing life 'bio brick' by 'bio brick' is I argue, the most important skill for future constructors who must, by necessity, "increase global biodiversity by inventing new life forms" (Kac, 1998: 1).

DIY bio is but one example (albeit a very strong one) where idiosyncrasy, creativity and 'difference' – characteristics essential to the negation of entropy – are promoted. To conclude, I bring the focus back to the original subject of this thesis, ageing populations, and how they can be re-imagined, re-engineered and re-constructed, toward behaviour change that benefits the biopolitic as a whole. I argue that concentrating on deregulation as a further extension of liberal subjectivity ensures that 'self interest' necessarily translates into a caring context, for longer living populations will by necessity come to appreciate to ever greater degrees the collective and integrated context within which they intend to live their longer lived lives. This further extends to an appreciation or 'care for all' as the single greatest resource human beings have to ongoingly overcoming the problems we collectively face; the collective power of human ingenuity and intelligence that emerges – or is generated by – our ever increasingly differentiated 'selves'. In this sense I anticipate that the value of human life, and the need to address the gaping disparities between excess and lack in the world's populations (Fry, 2009b), can begin to be re-understood, re-imagined and re-engineered toward what must become necessarily a futuring collective.

Chapter 9: Thesis Conclusion

The final chapter reiterates the core arguments made in this thesis, that a swift and necessarily radical re-imagination of the frontier of what is possible for the species is of utmost urgency given the unimaginable condition that otherwise confronts us this century. In light of this urgency I am of the opinion that, contrary to Fry (2011), *Design Futuring* (2009a) does not require the wholesale abandonment of liberalism, biopolitics, science and technology or economic fundamentalism, rather a re-interpretation and redirection of these forces toward the cultivation, not consumption of, the future. I reiterate that such a potential requires individuals to empower themselves to make the choices, practice the practices and exploit emergent technologies available for the purpose of constructing this future. In light of emergent technologies that have the logic of deregulation at the heart of their self organised enterprise, it is my (admittedly optimistic) belief that if these processes of deregulation were further accelerated, future construction as a collective process, indeed as a *condition of being*, will 'spontaneously' emerge.

Chapter 2: From Big Bang to Baby Boom

In 1999 one out of ten people on this planet was aged sixty or older ... by the year 2050 that statistic will be one in three. (Perls and Hutton-Silver, 1999: xii)

The late twentieth and early twenty first centuries have seen an expansion of discourses focusing on age, ageing and the consequence of an increasingly ageing population ... Moreover, this ageing population is not passive. It holds higher aspirations for standards of living and life opportunities in later life than any prior generation and possibly any generation yet to come. (Gilbert, 2006: 75)

Popularly likened to a "pig in the python" (Jones, 1980: 1) by demographers, town planners and politicians alike, the maturation of the post-WWII 'Baby Boomer' generation, a bulging demographic anomaly in developed countries, is set to transform aged and ageing experience in unprecedented ways with significant ramifications for the remaining members of these societies. This chapter will illustrate the unique characteristics that come to form the 'Boomer' identity in order to deliver an impression of how these particular traits will manifest to challenge preconceived notions and stereotypes of ageing and aged experience, and in turn what these challenges may bring.

In the developed world there are approximately 450 million Boomers (Coughlin, 1999). The United States holds the largest Boomer constituency with 78 million (Smith and Clurman, 2007: xv), over one quarter of the entire US population. As Boomers have progressed throughout their lives, the major economic and policy objectives of both the public and private sectors have been at the exclusive service of this demographic who, by sheer numbers alone, are argued to be more powerful than any individual government, economy or multi-national corporation (Kaplan, 2004: 7). They are today, and for the next 20-40 years will remain, the largest, most affluent and most influential force the world has ever seen (ibid.: 7). How Boomers will continue to shape the social, cultural, economic and political landscape in the years to come can be understood through an investigation of the predispositions and preferences they have developed over the past sixty years, a psychology that Smith and Clurman (2007) argue is brought fully intact with them into their maturation.

From the beginnings of their lives Boomers were different from their parents. The result of the fertility boom produced by unprecedented economic and social prosperity following the end of WWII, sheer numbers alone guaranteed the "pig in the python", a generational identity distinct from that of their forebears. Yet, as critical to the formation of their identity were the social and cultural events through which they developed. Boomer parents grew up in an era marked by the Great Depression of the 1930s and the two world wars either side of that. Coming into the world with very little in terms of economic and political security, Boomer parents maintained an ethos of conservatism and piety to the hierarchical order of society, exhibiting an obsequious deference to the power of God (and in turn the State) throughout their lives. In this capacity, Boomer parents are historically understood as the "sacrificial generation" (Smith and Clurman, 2007: xxiv), one whose primary character can be defined by its members' subordination to the strict hierarchical order of the time. Their children on the other hand, especially those born between 1946 and 1965, grew up in a period of unbridled prosperity not constrained by the same economic or military forces. Boomers' formative experiences centred around an attitude or

promise that tomorrow would always be brighter than today, and in the booming commodity markets of the 1950s, 60s and early 70s, they pioneered a shift from a production based 'industrial' economy to a consumption based 'consumer' economy. Concurrent with the advent of new materials, technologies and products that afforded 'lifestyle' choices (lifestyle itself a neologism coined to describe the new era of personal indulgence) completely alien from that of their parents, Boomers lived what was the literal manifestation of the freedom and prosperity their forebears had both fought and died for. As Smith and Clurman explain:

> *Boomers grew up with a presumption of economic security, and thus a sense that the future could be taken for granted and would assuredly turn out to be a brighter place than yesterday or today ... Life would assuredly turn into some version of the 1964 World's Fair* (Smith and Clurman, 2007: xxii).

The prosperity of this era was translated through the burgeoning commodity markets that saturated Western households with new materials, products and possibilities that would change not only the form of this era but the *expectations* of those living within it. Materials such as Nylon, Styrofoam and Vinyl transformed household surfaces into those synonymous with lunar exploration modules. The rampant proliferation of household appliances for cooking, cleaning and entertainment led to the production of a whole new household economy, where colour TVs became 'naturally' complemented by frozen 'TV dinners'. The magic of Polaroid was iconic of the instantaneous gratification the modern household economy offered, where the push of a button could transform the banal into the technological sublime. But that was just *in* the home. Arguably the outside world became subject to a greater transformation born of the freedom enabled by the automobile, an object no longer the privilege of an elite few but the birthright of many. The automobile came to determine not only the new coordinates of space and time but the shapes of towns and cities with urban planning and infrastructure yielding to the expansion of 'the suburbs'. Concomitantly, in shape and form, those cars became increasingly mimetic of spaceships, a sign of the endless frontier that exponential progress enabled. Celeste Olalquiaga identifies how the aesthetic iconography of the 1950s and 1960s, imbued as it was with an obsession for the abundant and unlimited reach of progress, extended to the infinite reaches of the solar system and universe, the signs and symbols of the era suggesting the space age was so close one could 'reach out and touch' it. As she states:

> *Architecture and design in particular denote this temporal displacement with an aerial, "futuristic", intergalactic aesthetics that is predominantly geometrical and curvilinear and is known as biomorphism. Angles and circles act as metaphors for speed, space, rockets, and planets, while curves convey a fluidity that is not only representative of the absence of gravity but also overflowing with verbal and visual allusions to space. Likewise, stars are a popular motif, maps imply a much desired universality, and locations (and products) are often named after astronomical entities* (Olalquiaga, 1992: 24-5).

Unlike their parents whose lives were governed by scarcity and piety, Boomers' sense of limitlessness allowed them the freedom to pursue experimental, esoteric knowledge and ideology, exploring concepts such as "meaning" and even "enlightenment" (Smith and Clurman, 2007: xxiv). Just as consumer culture enabled individuals to commodify their identity, so too was ideology a 'free market' where beliefs and value systems

could be endlessly exchanged with little regard for tradition and conservative values. Not forgetting that it was Boomers who pioneered 50% divorce rates in marriage (Bramlett, 2001), proving that sexuality was as much a part of the new affluent consumer ethos as anything else, Boomers held a seemingly irreverent disregard for the values, morals and scruples of the rigidly defined sacrificial generation that preceded them. Instead they chose to either 'tune in, turn on and drop out', or, often concomitantly, express their freedom and individuality through the burgeoning commodity markets that enabled them to quite literally purchase any identity they wished as frequently as their newly acquired credit card limits allowed. Smith and Clurman identify this shift in just one generation from a prevailing ethos of self-sacrifice, the 'sacrificial' or silent generation, to one of supreme self-indulgence and self-glorification: 'Baby Boomers' (2007: xxiv). In the context of the timeline of human history there is arguably no greater rupture in lifestyle or ideology as that which occurred between these two generations. Therefore the first major defining characteristic that can be employed to aid an understanding of the Boomer cohort and what they bring with them to ageing and aged experience is a psychology of affluence, the 'boom' in Baby Boomer.

Their second major defining characteristic, and that which relates to both the celebration of youthfulness and the malleability or plasticity of identity afforded to this age, is the former part of their title, the 'baby' in the boom. For a demographic entity this kind of branding implies an everlasting infancy that at the age of 60 and beyond they appear reluctant to relinquish (Smith and Clurman, 2007: xxii). They are, quite literally, the youngest old people ever to have lived, and the freedom and opportunity this youthfulness affords is something marketers and advertisers exploit relentlessly as Boomers seek to nurture and cherish this "forever young" (Dylan, 1974) ethos, maintaining it fully intact into their maturation. In 1996 a US survey found that when asked at what age old age begins, Boomers produced a mean response of 79.5 years. What is interesting to note here is that in 1996 the average life expectancy in the US was 76.1 years (Smith and Clurman, 2007: 35), demonstrating that the majority of Boomers literally believe that they will die before they get old!

In more recent years the economy has seen a shift in focus toward the production of more luxurious and flamboyant commodities that cater to Boomers' seemingly insatiable desire for pleasure goods and services, from sports cars to SUVs, motorcycles, luxury boats, caravans, cruises and holidays, and the contemporary phenomenon of the 'day spa'. Boomers are enjoying, and will continue to enjoy, the golden age of the retro-juvenile for some time to come, but this begs the question as to what will they do once the grey nomad disappears into a Western Australian sunset (luxury goods in tow) only to come full circle and return? What demographic researchers and town planners have been at pains to assess is how the current practices and infrastructures of ageing (the python) will stretch to accommodate Boomers (the pig) who will come to occupy them in the coming decades. A significant and revealing piece of evidence begins with the adjective "ageist" or "ageism", which can be seen appearing more and more regularly in the popular lexicon (Harvard, 2006: 1). Just as Boomers have been pioneers in developing the ethics around race and sex (outlawing xenophobia, homophobia, championing multiculturalism, feminism, gay marriage, etcetera), so too does the politically correct sanitation of public language now cater to the sensitivities of the ageing and aged. "Boomers are touchy about ageing" (Court, Farrell and Forsyth, 2007: 8), and

therefore seek to devise new ways to perceive old habits and dogmas concerning the very adjective 'old'. In the US in 2006 the Harvard School of Public Health launched a campaign to ban the term "elderly", saying it was "profoundly demeaning and stigmatising" (2006: 1). Instead they sought to promote healthy and productive attitudes toward ageing and aged experience through a suite of neologisms and that re-imagine preconceived notions and stereotypes of what this stage of life actually means for those living it. Common puns emerging suggest instead of senior citizen, 'seasoned citizen'; instead of geriatric, 'geri-active'; and importantly, not the older generation, but 're-generation'. What were once considered the twilight years are now increasingly understood as 'prime time'. 'Too old', it would appear, is soon to be a saying of the past, and like other demeaning terms turned libratory by marginalised groups such as 'Niggers' and 'Queers', the expressions 'Too Old', 'Old Bastard', 'Old Boiler', etcetera, will be for the exclusive use of those 'in the club' who will turn these meanings around to mock the inherent essentialism, the stereotype of ageing, into a cause of resistance and celebration. What this cultural re-interpretation suggests is that age, although descriptive of how old one is, is neither proscriptive nor prescriptive of how or what one 'should' be doing at any particular point in time. Increasingly, we are coming to view the established, routine ways of understanding age as out of synchronisation with the emergent circumstance in contemporary society, one in which age is less and less a determining factor of what and who we are, and how we 'should' be according to expectations inherited from draconian stereotypes and essentialisms.

Evidence of the emergent 'anti-ageing' attitude is prevalent throughout the public imagination in a variety of ways. 'Sexing up' over 55s and the veritable bounty therein sees Australian Pensioners Insurance Agency use an upbeat advertising campaign to launch the acronym 'APIA', as much a convenience of the times as a strategy to do away with the descriptive term (and its associated connotations) that Boomers can't bring themselves to hear (*pensioner*). The popularity of the term "S.K.I-ing" (Spending the Kids Inheritance) is emblematic of an attitude and ethos that refuses to budge from the indulgences showered upon Boomers in youth, and becomes even more so pronounced as Boomers age and develop some of the inevitable characteristics of old age. As described by the father of Geriatrics, Ignatz Leo Nascher, old age produces "… an overwhelming interest in self, a selfishness which gradually subordinates every other interest in life to the welfare of the individual … [it] is also the cause of his selfishness, his egoism and temperamental changes" (in Katz, 1996: 85). Though such age related changes in a person's psyche are characteristic of the dominant, traditional stereotypes of ageing, they can be appropriated to complement 'youthful' exuberance and recklessness. Boomers do this exceptionally well through their favourite mode of individual expression, the unbridled consumption of goods and services.

Through generational predisposition and clever marketing campaigns that tap a seemingly unlimited propensity for self indulgence and self gratification, attitudes toward ageing and aged experience in the popular imagination of Western developed societies are under extreme revision, prompting redefinition, even semiotic reversal of what can be expected in these latter stages of life. Exemplified in the words of hit 1980s music producer Quincy Jones: "when you're over the hill, that's when you start to pick up speed" (Harvard, 2006: 1). However, determining what forms this particular redefinition of ageing might take requires an analysis of how Boomers will

cope with what are inevitable changes to their lives as a result of the ageing process. 'Expectation' is a crucial defining factor in determining how Boomers will act now in anticipation of tomorrow, as McKinsey Research suggests:

> *This group has enjoyed more opportunities than any other generation in US history ... [they] attained high levels of education, and benefited from the rapid growth of the economy and the stock market, during the 1980s and 1990s, while building careers* (Court, Farrell and Forsyth, 2007: 3).

With the encroachment of an ageing that begins with debilitation then inevitably descends into decay and ultimately death, how do the expectations of those who have come to expect a great deal shift to accommodate the knowledge of their ultimate demise? To grasp an idea of how they will do this I will once again turn to Boomers' formative experience to gain an impression of how they (and the industries that support them) anticipate, and therefore expect and in turn make manifest this 'stage' of life. Ian Hamilton-Grant's interpretation of Donna Haraway's work as a perspective through which fact can be seen as the past tense of the fiction that creates it (1998: 69) is prescient in this regard. This observation will be a recurrent theme throughout this thesis, applied in many and varied contexts as a way of both understanding, and pre-emptively engineering, key developments and analytical concepts.

Change

Though the events of the 1960s counter culture suggests Boomers were preoccupied with protests and other forms of resistance – of *defying* the system – Smith and Clurman argue this attitude was not so much about peace, love and saving humanity from nuclear annihilation as it was about liberation of the self. "The rule breaking endemic to that era was about overturning barriers to the self, not about overthrowing the system. The self was not to be hemmed in, so Boomers became rule-breakers *par excellence*" (Smith and Clurman, 2007: xxv). During the economic/fuel crisis of the late 1970s, then US President Jimmy Carter set an unprecedented tone in stately address as he talked for the first time in American history of a 'future of limits' (Biven, 2002). Boomers have since run riot against this warning, unshakable in their fundamental belief in a future that affords them the generational luxury of focusing on self discovery, self development and self fulfilment. Abandoning the ethos of free love and LSD that marked previous decades, Boomers have in turn reinvented themselves in the form of the 1980s 'Yuppie' or 'Yippee' (a hybrid of *Hippie* and *Yuppy*), demonstrating that freedom of choice (and self indulgence) is not only ideologically interchangeable but a hallmark of generational identity irrespective of form *or* substance. "Sacrifice", as Smith and Clurman explain, "has never been a part of their generational character … Boomers face up to challenges and limits not by abandoning their focus on self but by changing the kind of self on which they focus" (ibid.: xxix). As Boomers enter the next phase of their lives they are cognisant of physical age, but:

> *Don't accept these limits now any more than they have accepted limits of any sort ... The self fulfilment they want for themselves in the years to come continues to be tinged by the indulgence that is a corollary to fending off limits ... they will reinvent everything they encounter* (Smith and Clurman, 2007: xxix).

Boomers have traditionally shown an unprecedented plasticity and malleability in adapting and coping with the opportunities and demands of an ever accelerating consumer driven market economy. Their formative experiences have by necessity not only made them open to change, but instituted it as an inherent part of existence. *The only constant*, as a host of Boomers have told us (echoing Heraclitus) *is change*. As stated in the epigram to this chapter by sociologist Tony Gilbert: "This ageing population is not passive. It holds higher aspirations for standards of living and life opportunities in later life than any prior generation and possibly any generation yet to come" (2006: 75). The McKinsey Global Institute (2007: 2) found that "Optimism defines Boomers", with 86 percent agreeing with the fact that they "have always deserved a good life" (Court, Farrell and Forsyth, 2006: 4). Extraordinarily, this attitude is taken to an audacious, if not hubristic extreme with the same survey recording that seventy-eight percent of Boomers believe they can "control their own destiny and survive anything" (ibid.: 4).

The secret to this seemingly boundless enthusiasm for their own unlimited potential might reside in the fact (along with the observation that these surveys were conducted in the over inflated hyper optimism of the United States) that Boomers are used to confronting challenges and getting what they want. As Smith and Clurman explain:

> *They are the modern day pioneers of identity shifting. Boomers (unlike previous generations) have had multiples of everything – multiple jobs, multiple marriages, multiple families, multiple homes, multiple hometowns, multiple experiences, multiple brands, and more. Throughout their lives they have had to be in command of keeping up with rapid change. Their experience and comfort with the accelerating pace of things is longstanding and wide ranging, covering new technologies, new media, new software, new jobs and job skills ... As a result ... flexibility and contingency have long been central to their repertoire of life skills. Boomers are well prepared for a future of self invention* (Smith and Clurman, 2007: 68-70).

A key element to this dimension of their psyche can be explained in part by an idea advanced by Professor of theoretical medicine Bruce Charlton. Charlton understands contemporary society as "protean", that being a characteristic of or resembling the Greek god Proteus who has a variable nature or an ability to assume different forms, displaying great diversity and variety in constitution and character. Charlton argues that a childlike flexibility in adults is essential for survival in these "protean" times, thus people do not necessarily become adults in the idea of a mature and therefore fixed and immutable self. It is the suppression of this psychological maturation in proportion to a person's physical maturation that Charlton identifies with the term "Psychological Neoteny" (2006). Neoteny comes from the Greek 'Neo' (New) and 'Teinein' (to stretch or extend), and implies a youthfulness in age, or in biological terms a fertile sexuality till late in the life of an organism. This form of psychological plasticity is appropriate to modern life in that it facilitates adaptation. Boomers, it seems, have it inherently, or have taken it up out of necessity. It creates a mindset of possibility that enables a constant state of 'becoming'. Adding further critical weight to this concept is the perspective of social critic David Brooks. In *Bobos in Paradise: The New Upper Class and How they Got There* (2000), Brooks identifies Boomers as "Bobos", "Bourgeois Bohemians" who are a historically unique mixture of styles: the

youthful bohemian spirit of the 1960s coupled with the midlife bourgeois ambitions of the 1980s. The result is a paradox of conflicting sensibilities that are combined in the same sub-cultural constitution. This is exemplified by the aforementioned 1960s counter-culture 'Hippie' that switched seamlessly to become the 1980s 'Yuppie' (or previously mentioned 'Yippee'), a surface contradiction that belies the consistency of an attitude of freedom that binds and coheres these paradoxical cultural formations. These conflicting incongruities are the quintessence of cogency in contemporary society. Brooks notes that 'potential' is their definitive characteristic, the potential to not only become anything but to in turn free themselves from whatever they become, enabling and indeed celebrating contradiction and irony.

Another way of approaching this idiosyncratic psychological adaptability is to see it through the lens of information theory that developed (incidentally) immediately after the end of the Second World War. The study of Cybernetics came from the research of Norbert Weiner and his analysis of Cybernetic Information Systems, popularised during its exposition at the Post WWII 'Macy Conferences' (to be covered in more detail in following chapters). Weiner's investigations deliver a key insight into the notion of uncertainty as a guiding principle with which to resist the terminal nature of entropy or 'noise' in cybernetic informational systems. N. Katherine Hayles, writing on Weiner in *How We Became Posthuman* (1999), notes that for a system to fend off the encroachment of noise or entropic decay, it must be able to:

> *respond flexibly to changing situations, learning from the past, (and) freely adapting its behaviour to meet new circumstances, succeeding in preserving homeostatic stability in the midst of even radically altered environments. Nimbleness is an essential weapon in this struggle, for to repeat mindlessly and mechanically is to inevitably let noise (or entropy) win. Noise (entropy) has the best chance against rote repetition where it goes to work at once to introduce randomness. But a system that already behaves unpredictably is not so easily subverted. If a Gibbesian universe implies eventual information death, it also implies a universe in which the best shot for success lies in flexible ... behaviour* (Hayles, 1999: 78).

This logic exists primarily in machines, but can be extrapolated analogically to the anthropocentric domain, among others. As a process that works to resist noise – or entropy in the case of cybernetic information theory – it highlights the primacy of uncertainty as the principle organisational methodology in any endeavour to remain vital and survive the encroachment of entropic decay, or in the case of Boomers, senescent decline. That the psychological characteristic 'neoteny' shares similar traits to that of cybernetic information theory leads to a deeper understanding of the Boomer mentality, one that brings with it to the process of ageing an attitude and ethos that contradicts the traditional understandings and practices of the field of gerontology. The idea of a self that is not stable and immutable but interchangeable, experimental and hybrid in nature is consistent with what are understood as 'postmodern' characteristics, reflective of wider cultural mutations occurring in the latter half of the twentieth century.

The rationalism and empiricism of Francis Bacon gained credence with René Descartes' 17th century metaphysical axiom *Cogito Ergo Sum* (I think therefore I am), which established the sovereign subject as the singular foundation of identity, the 'I'. Descartes' 'mind/body split' separated the irrational impulses of the body from the

rational logic inherent in the 'God given' mind, leading to the conception of a singular identity that would serve as the basis for all knowledge (and correspondingly all human ontology) to stand as perfect, concrete and eternal. Cartesian logic posited a singular stable rationality from which the modern singular subjective 'truth' could be unequivocally determined.

This 'I' remained firmly intact until the post-WWII economic and fertility boom disassembled the traditional formations and infrastructures of identity, largely the result of booming commodity markets that promoted and facilitated an experimental, disorganised and de-hierarchicalised material and ideological milieu. Frederick Jameson illustrates this shift in his seminal article 'Postmodernism and Consumer Society' (1983). Here Jameson suggests that postmodernism can be characterised by the two poles of 'pastiche' and 'schizophrenia'. Pastiche is parody that has forgotten its ulterior motive, like pulling a face only to have the wind change, thus the face becomes, unwittingly, the pose or 'poses' assumed in the post-modern, hyper-real, techno-cultural milieu. Schizophrenia, as Jameson appropriates it from psychology:

> *is an experience of isolated, disconnected, discontinuous material signifiers which fail to link up in a coherent sequence. The schizophrenic thus does not know personal identity in our sense, since our feeling of identity depends on our sense of the persistence of the "I" and the "me" over time* (Jameson, 1983: 119).

Jameson argues that the playful mimicry of stylistic tropes and gestures both past, present (and imagined future), have prompted individual sovereign subjects to abandon their core identity, fleeing, as Jean Baudrillard famously said, "the desert of the real" for the ecstasies of hyper-reality (1983: 1). Olalquiaga similarly concurs in that via the mimicry of a future we created through the dream of progress (evidenced by the rampant proliferation of science fictional narratives and representational motifs), we have become "Lost in Space" (1992: 19). Boomers invented the behaviour that defines postmodernism (what is a "Yippee" but a multiple identity disorder), yet they have capitalised on these 'rules' – or the lack of them – to their advantage. In the dizzying cultural formations that began in the latter half of the twentieth century, the characteristic impressions of Boomers having a dislocated, fragmented subjectivity, analysed in decidedly 'negative' tones by Jameson, Baudrillard and Olalquiaga, are in fact necessary strategies for survival in complex, mutating postmodern environments, if we advance the theories of Charlton, Brooks, and Weiner.

It is this potential for flexibility and commitment to (if not inherent expectation of) change that generates a perception of seemingly 'endless' possibility for Boomers. According to Smith and Clurman, the customary predeterminations of ageing and death are trans-mutating into a newly conceived golden age where "boomers will age, but they won't get old" (2007: 5). The Boomer-centric compulsion toward 'lifestyle' evidenced by their penchant for excessive self gratification, means it is likely Boomers will choose to commodify their ageing ontology, as demonstrated by the burgeoning markets for plastic surgery (American Society for Aesthetic Plastic Surgery, 2005), as well as other cosmetic enhancements and pharmaceutical therapies for age related issues such as Botox and Viagra. Such developments suggest Boomers are more than willing to both experiment and spend considerable amounts of money on such 'enabling' goods and services, reiterating the attitude that the ageing process

might not necessarily be a natural 'inevitable' but an archaic and redundant cultural convention, a cultural 'construction' that prescribes for ageing and aged experience what 'should' be felt, experienced and in turn anticipated. An emerging group of theorists identify this 'culturally constructed' plot as a 'decline narrative', implying that it is one that can be re-written and *re-engineered*.

In "*Declining to Decline: Cultural Combat and the Politics of the Midlife*", Margaret Morganroth Gullette (1997) contests the "mainstream connotations of 'ageing' as a natural, biological, prenarrativised, ahistorical, universal decline" (ibid.: 14). She proposes that we are "aged by [our] culture" via a regime of "age ideology" (ibid.: 3) that is "popularly disseminated, semiconscious, so familiar and acceptable that it can be told automatically" (ibid.: 161). Using Gullette's argument, Christine Overall similarly proposes that "Different human ages are accepted as both real and universal, separable from each other and also from ongoing life processes, and they thereby require ontological status" (Overall, 2003: 35). Overall goes on to suggest that in contemporary Western culture, "human ageing is structured by a biologised, asocial concept of decline" which "replaces all other sources – accident, history, economics, politics – with a body based narrative that permits only one meaning: personal declineoldageanddeath (sic)" (ibid.: 36-37). In accordance with the discourse of decline, Gullette understands popular opinion to be a formula where "'age' equals 'ageing' equals 'old age' equals 'sickness' equals 'death'" (Gullette, 1997: 8-12). Even when we are materially well off, healthy, accomplished, and likely to live long lives, Overall suggests that this decline narrative acts as "a stressor, a depressant … a psychocultural illness that affects almost every one of us" (ibid.: 36). Overall argues that we underestimate the possibilities inherent in older age due to these negative interpretations of ageing and aged experience: "the assumption that current biological restrictions on the human life span have, in themselves, a normative force for personal decision making and social policy formation is unjustified" (Overall, 2003: 34-35).

This interrogation foregrounds a hotly contested site of individual liberation from the constraints of normality or 'normalisation' as they have been prescribed by the discipline of bio-medical gerontology. Bio-medical gerontology emerged from the enlightened scientific discourses of the 18th and 19th centuries, and became the subject of a major critical revision at the beginning of the 21st century due to the widespread use of the analytical techniques of French Social Historian Michel Foucault (Powell and Wahidin, 2007). Through a Foucauldian style excavation or 'archaeology' of the historical construction of knowledge, it is argued by a number of prominent sociologists (ibid.) that Foucault's methods can aid in our understanding of how our taken for granted, 'normalised' assumptions regarding ageing operate within a larger 'carceral archipelago' or network limit that manages the perceived 'problem' of aged and ageing bodies. In order to understand how these 'carceral' techniques operate I will now excavate the history of these formations of the discipline of bio-medical gerontology, in turn applying that knowledge to ageing and aged experience in the 21st 'Boomer' century to see how such revisions could impact upon the practices, expectations and epistemology of the discipline of bio-medical gerontology.

Gerontology Revised

The disciplinary and classificatory practices of ageing are collated and instrumentalised via the discipline of bio-medical gerontology which emerged out of

the field of 'Geriatrics', first introduced to the medical and social science community in 1909 by American physician Ignatz Leo Nascher. In his seminal text *Geriatrics: The Diseases of Old Age and Their Treatment* (1914), Nascher describes how the elderly were classified according to the levels or stages of physical decay. Nascher's text set the tone for the field of gerontology that considers ageing exclusively as a 'problem' to be managed. In more recent times there has been a growing development of broad social theories of ageing identified as "functionalist gerontology" (Powell and Wahidin, 2007: vii), where we see the evolution and development of 'Marxist' gerontology in the 1980s (Phillipson, 1982; Phillipson and Walker, 1987), 'feminist' gerontology in the 1990s (Arber and Ginn, 1995) and 'postmodern' gerontology towards the millennium (Gilleard and Higgs, 2000). Despite contributing to a broader conception of ageing and aged experience, little has changed in terms of the way these theories of ageing retain a central focus on old age and ageing as a pathological 'problem'.

Until recently, all branches of gerontology that analyse the biological, social, economic and demographic dimensions of ageing maintained a 'positivist' outlook as it was developed in the 17th and 18th centuries. Positivism is a scientific discourse that considers theological and metaphysical interpretations of the world to be 'imperfect' modes of knowledge, and that positive knowledge, based on 'natural' phenomena and their properties and relations as verified by the empirical sciences, are the soundest means toward arriving at the (T)ruth, that is to say, Truth with a capital 'T'. The various knowledges associated with positivism gave rise to what was to become the so called 'age of reason', which in the latter half of the 18th century was to celebrate an ideal of progress driven by the belief in the 'modern', an all pervading ideology that sought to replace all existing thought and frames of reference with the enlightened view of rationality and a belief in the superiority of the scientific method. Such a movement was spurred on by the complementary rise of capitalism and the growing momentum of the industrial revolution that became the engine and the evidence for the omnipotence of this omniscient way of 'seeing' (sight here privileged as the superior sense) the world.

Crucial to the understanding of ageing as the subject of scrutiny of these discourses was a concurrent development in knowledge formation stemming from philosophy. The recently mentioned metaphysical axiom of philosopher René Descartes, cogito ergo sum (I think therefore I am), sought to locate reason as the hierarchically privileged site of awareness and basis for all knowledge. Central to Descartes' formulation of this universal basis of knowledge and truth was his idea that mind and body were separate entities, the body subservient to the instrumental governance of the mind. Descartes vigorously sought to sever body from mind, the repercussions of which proliferate to this day in a variety of dominant 'expert' knowledges, discourses and disciplines where the body is conceived not as an inextricable part of who we are but identified as a part of nature and therefore something to be 'objectively' managed and controlled. The belief that the impulses of the body could be controlled by the clinical rationality of the mind became the mantle for a suite of 'expert' disciplines that sought to frame the world in exclusively instrumental terms. From this period emerged a number of 'superior' opinions, 'expert' knowledges that appear to distinguish truth from fallacy, the knower from the known, and the object from the subject of knowledge. Jürgen Habermas' critique of reason as a legitimising force (Ingram, 2010, 22), resonates through what Powell, Biggs and Wahidin state:

> *Differentials, in terms of who may have access to and be able to deploy 'reason', served a legitimising function separating 'scientific experts' from the 'subjects' of knowledge ... (where) individuals will tend to define themselves via their position or identity within a power relationship such as those of doctor/patient, judge/judged, care nurse/elderly patient* (Powell, Biggs and Wahidin, 2006: 6).

Along with a host of other disciplinary regimes that sought to classify and control the multifaceted aspects of human culture came 'technologies' centred on ageing which, under the spectre of Western science and rationality, suddenly became a 'problem' discourse. Subject to the scrutiny of the expert who could determine and demarcate using the power accorded to 'him' (the expert was more often than not a man, reflective of the wider patriarchal regime that instituted such a regime in the first instance). Through the empirical, positivistic biological and psychological understandings of humanity, age categories emerged during this epoch as a fundamental taxonomy upon which people were categorised and societies stratified. According to Powell, Biggs and Wahidin: "There has been a long tendency in matters of ageing and old age to reduce the social experience of ageing to its biological dimension from which are derived a set of normative 'stages' which over determine the experience of ageing" (2006: 7). Ian Hacking claims the notion of 'normal' identity provides a powerful framework for everyday life and individuals: "The normal stands indifferently for what is typical, the unenthusiastic objective average, but it also stands for what has been, good health, and for what shall be our chosen destiny" (Hacking, 1990: 23). Hacking argues that the very adjective "normal" has been exploited to the point where it is now "one of the most powerful ideological tools of the twentieth century" (ibid.: 23).

Under the reign of the normal, social and interpersonal experiences are marginalised because they are difficult to fit into a testable, objective framework. By separating minds (expert knowledges) from bodies (the aged), we see a continuation of the Cartesian tradition where the means justifies the end in a contradictory spiral of reduction and limitation, a 'limit' no more clearly expressed than in the construction of 'age' discourse. According to Powell and Biggs and Wahidin, older people who are sick become an object to be modified under the 'bio-medical gaze' where people become their bodies "disaggregated into a series of dysfunctional parts" (2006: 10). As they argue, this perspective becomes useful for the bio-medical scientific analysis of function and remedy, but severely limits any perspective that takes into account interpersonal and wider social factors (ibid.: 10).

Foucault

As Steven Katz illustrates in *Disciplining Old Age: The Formation of Gerontological Knowledge* (1996): "Unfortunately Foucault said little about old age and one can only speculate as to the ingenuity of his insights on the subject had he lived to elder hood" (Katz, 1996: 7). Not to be deterred, Katz, who is seminal in the application of a Foucauldian analysis to ageing, demonstrates the salience of such an approach by initially substituting the words 'sex' and 'sexuality' with the word 'age' in one of Foucault's key passages from *The History of Sexuality*:

> *Age appeared as an extremely unstable, pathological field: a surface of repercussion for other ailments, but also the focus of a specific nosography,*

that of instincts, tendencies, images, pleasure, and conduct … Age is not the most intractable element in power relations, but rather one of those endowed with the greatest instrumentality: useful for the greatest number of manoeuvres and capable of serving a point of support, as a linchpin, for the most varied strategies (Katz, 1996: 7).

Congruent with Foucault's work that has sought to problematise issues of madness, illness, deviance, criminality and sexuality as socially constructed problems, the discourses and practices that govern the experience of ageing via the discipline of bio-medical gerontology are subject to similar forms of expert knowledge, categorisation, disciplinary knowledge and normalisation.

For Foucault (1977) the body is not 'natural' but 'created' and reproduced through biomedical discourse. In *The Birth of the Clinic* Foucault illustrates how the medical gaze opened "a domain of clear visibility" (Foucault, 1973: 105) for doctors, by allowing them to construct an account of the condition of the patient and to connect signs and symptoms with popular diseases. A Foucauldian approach therefore enables the scope of ageing to be broadened beyond bio-medical accounts of the body. To indulge a Foucauldian analysis in the context of the history of ageing, his work invites us to recognise that ageing is not only a 'problem' socially constructed by the bio-medical sciences, it is furthermore symptomatic of the underlying relations of power and knowledge that cut across and through age, class, gender, disability and sexuality. Powell and Phillipson agree in that:

A Foucauldian discussion has significant implications for how ageing is understood both as a discipline of study, and as a social process: as a discipline in interrogating how knowledge in the modern era has been organised and legitimated; [and] as a social process in terms of complex interactions between recent social policy, popular culture, institutions and older people (Powell and Phillipson (2004) in Powell and Wahidin, 2006: vii).

In combination these theories refer to the discourses, perceptions, sites and practices that are conditions of possibility for the emergence of gerontological knowledge. Estes and Binney (1989) have used the expression "biomedicalization of ageing" which highlights how individual lives and physical and mental capacities, originally thought to be determined solely by biological and psychological factors, are in fact, heavily influenced by the social environments in which people live.

Though in its infancy this trend toward the application of Foucauldian analysis to ageing discourse invites speculation as to its taken for granted assumptions, the means by which it is legitimated by disciplinary experts, and thus how aging 'should' be experienced and understood in terms of the expectations we have about it and importantly, how it is administered *biopolitically*. What a Foucauldian revision demonstrates is the manner in which bio-medical discourse comes to shape and determine the experience of ageing itself, revealing a potential for mutability, interchange-ability and adaptability. To re-iterate Hamilton-Grant's interpretation of Donna Haraway in this context, (scientific) fact is the product, *the past tense*, of the (science) fiction that produces it (1998: 69). In contemporary ageing discourse there is overwhelming support (from the overwhelming number of aged and ageing citizens) to revise and re-engineer what these trajectories are for ageing populations, producing a culture, I argue, that is literally 'willing' a new paradigm of ageing into being.

Contestations to the Foucauldian analysis of ageing, such as that by Tim Owen (2006) among others, adopt the general critique of cultural relativism that are the stock standard refutations against Foucauldian analysis and what can be loosely described as post-structuralist or 'post-modern' thinking in general. Indeed, such arguments extend to the very rift between *The Two Cultures* (1959, 1961) as outlined by C. P. Snow, which gained increasing attention in the 1990s as the division between 'positivist' and 'vitalist' understandings of existence (scientific versus agnostic), exploded in the *Social Text* hoax. Here, physicist Alan Sokal (1996) successfully exposed the wishful thinking of cultural relativism by facetiously proclaiming, amongst other things, that quantum gravity is a social and linguistic construct. Critiques of a Foucauldian analysis of ageing revert back to the same form of contestation and inevitably reach the same impasse as that which Snow outlined over half a century ago.

As the coming analysis of the contemporary emergence of biopolitics will reveal, in the emergent era of molecular biopolitics (and the concomitant rise of ethopolitics) critiques of relativistic thinking are wavering as individuals, the state and the entrepreneurial sector all gravitate toward the flexibility and open ended possibility a Foucauldian approach encourages. As the following analysis suggests the very basis of normality and the natural (particular to ageing) are called into question in the form of not only noumenological (cultural) but phenomenological (physical/material) revision.

I have thus far outlined how Boomers as a demographic force are changing the perceptions of ageing and aged experience, both by their own volition as a demographic cohort (clearly not wanting to age gracefully, piously, nor obsequious to the natural order) and inspired by an upbeat 'can do' marketing rhetoric evidenced by the 'booming' industry in Boomer marketing literature. Titles released in the past decade alone include the already mentioned *Generation Ageless: How Baby Boomers Are Changing the Way We Live Today . . . And They're Just Getting Started* (Smith and Clurman, 2007), *The Boomer Century, 1946-2046: How America's Most Influential Generation Changed Everything* (Croker and Dychtwald 2007) and *Prime Time: How Baby Boomers Will Revolutionize Retirement And Transform America* (Freedman, 2002) to name but a few. Such Boomer-centric hyper optimism is largely a compensatory reflex to the anticipated decline of this demographic cohort, the growth in market research literature demonstrating the importance of this demographic shift to existing industry and entrepreneurial interests. Threatened by the 'inevitable' decline and departure of the greatest consumer demographic the world has ever seen, the race is on to extract profit from Boomers' remaining years, ideally by extending them for as long as possible. In this context I will now outline how demographic change is affecting the many armed apparatuses of 'biopower' as it is understood in the 21st century, using the changing expectations regarding retirement as an entry point to review the profound implications ageing Boomer populations are having on these.

Retirement

Smith and Clurman (2007) argue that Boomers want to stay young at all costs, and one of the most salient ways of doing that is to maintain an ongoing engagement and participation in society, to continue to *matter*, which drives a sense of both purpose

and indispensability. The most obvious (and in the coming argument most critical) way of doing this is through continued participation in the workforce. Despite the fact that retirement remains a concept and lifestyle attractive to many Boomers, there is a problem regarding the semantics of it in that it is something you do *when you get old*. In order to maintain the perceived youthfulness Boomers pride themselves on they will, according to Smith and Clurman, need to feel important and continue to matter, perceptions which continuing work provides (2007: 41-63). Though there is little argument that Boomers will ease the intensity of their participation, it is argued that retirement in the absolute sense will increasingly come to be seen as a cop out. Similar to the semantic revision of nomenclature concerning the 'elderly' covered recently in this chapter, neologisms are being devised to rethink retirement and how the boundaries can be blurred between outright stopping work and maintaining a useful, if more tempered, contribution. As the previously mentioned Harvard study on ageing culture insists, instead of "retire" why not "re-tread", or better still, "re-wire" (Harvard, 2006: 1). A likely model of work in the future would be "cycling" whereby Boomers undertake short term contracts, lending their experience and expertise to organisations for brief periods of time before opting out to pursue lifestyle and leisure options, only to cycle back into the workforce at their will (Smith and Clurman, 2007: 41-63). A 2007 US survey found that 84 percent of Boomers surveyed expected to work after they formally retired, and 63 percent said they couldn't see themselves ever retiring completely with "[o]nly about half of the surveyed boomers in management and professional roles planning to continue working for financial reasons ... The rest view work as a source of self-fulfilment and mental stimulation" (Court, Farrell and Forsyth, 2007: 5).

Lurking beneath the gloss of these hyper-optimistic, *can do*, distinctly US flavoured studies however, lay more deep seated concerns as to why the revision of 'retirement' is critical. Not so much for the lifestyle and longevity inflections they have on Boomers themselves, are the impacts mass retirement will have on national and world economies, whose very subsistences are threatened, according to the dire prognostications of demographic forecasters and public policy conservatives, confounded as to how to support and/or displace the 'burden' or 'problem' of ageing of Boomer populations.

Boomergeddon

> *With portentous consequences for the ratio of working-age taxpayers to nonworking retirees, these changes in age profile threaten the economic viability of the world's wealthiest and most powerful nation-states, tearing at the fabric of their once liberal notions of citizenship, constitutionalism, and social contracturalism ... population ageing places a glacier-like pressure on the nation-state, slowly but surely eroding its centralized apparatuses for managing the production and reproduction of life* (Neilson, 2003: 163).

Most Western developed economies share similar demographic disproportions as a result of Boomer populations, and therefore face similar challenges in regards to the retirement of the labour market staple of the past 30 years. Smith and Clurman argue that in the US alone:

> *Demographic extrapolations of a wholesale and absolute retreat of ageing boomers from the workforce project a labour shortfall too substantial for the*

economy to handle ... 40 percent of the nation's public and private workforce will be at retirement age by 2010 (Smith and Clurman, 2007: 53).

Cairncross argues that other OECD countries can expect similar numbers (2004). A critical issue to stem from this anticipated labour crisis is not simply the retreat of 'general', but 'skilled' labour from these economies, whose strength and power of the last 60 years is due to them being "knowledge" based economies (Lyotard, 1984). A 2005 survey sponsored by Ernst and Young found that 63 percent of human resource professionals believe that "the retirements of Baby Boomers will lead to a critical brain drain of knowledge and know how within their organizations" (Ernst and Young, 2006: online). James Canton, Chairman of the Institute for Global Futures, explains this in terms of the US experience:

> *More than 76 million baby boomers will retire over the next 20 years. They will take with them the collective wisdom of a generation ... This is a contributing factor to the crisis awaiting most organizations – the loss of wisdom. Also at risk is the amazing resiliency that boomers incubated, shaped and then brought into the culture. These are largely overlooked future challenges that will have major implications, some quite devastating, for organizations that fail to anticipate them. Without a serious commitment to using technology and crafting mentor programs to extract and pass along the knowledge of the boomers, significant amounts of critical knowledge may be lost and unrecoverable* (Canton, 2007: 106-7).

Canton argues that in the years to come individuals, companies and governments will become increasingly dependent on knowledge-based systems to administer "security, pollution, electricity, transportation, communications and health care" (ibid.: 108). The problem lies in that the designs of these systems come from the experience and knowledge of Boomers who, when they retire, "take that knowledge with them" (ibid.: 108). Canton's argument is that the necessary transition between ageing Boomers and the emerging knowledge based workforce in the coming years is neither swift nor comprehensive enough to facilitate a seamless labour shift from one generation to the next, and will have dire consequences unthinkable in today's economic climate.

This wholesale retreat from the workforce is, however, only the beginning of the woe that stems from ageing populations. Not only do they take the labour capacity and the skills and knowledges to optimise and administer that capacity with them, at one and the same time they create demands upon that system (a system debilitated by their departure from it) that defy its 'hindered' ability to cater to them. These alarming labour shortfall figures do in fact compound to a greater degree when they are considered in lieu of the drain on labour resources ageing populations produce. Of critical concern is the projected statistics of Alzheimer's disease.

At 65 Alzheimer's affects around one in one hundred people; at 87 it is closer to one in six (Kaplan, 2004: 13). By 2016 it is anticipated that Alzheimer's will become the leading cause of disability burden in Australia (ibid.: 14). Projections for Alzheimer's disease in the US predict that the number of people 65 and older afflicted with Alzheimer's disease will grow from 4.5 million in 2000 to 5.5 million in 2020, then 7.2 million by 2030 (Hebert, Scherr, Bienas, Bennet, & Evans, 2003: 267). Put into a larger context, Alzheimer's and other forms of dementia, currently estimated to be

affecting 27 million people in the developed world, will by 2040 grow to 81 million (Demasi, 2008). Considering that caring for someone with full-blown dementia is more labour and resource intensive than end stage cancer or chronic osteoporosis (Kaplan, 2004: 14), these statistics demonstrate how an already diminishing labour market will be further exacerbated by the critical care required for Alzheimer's disease and other forms of age related dementia anticipated to form what an Access Economics Report describes as an impending "Dementia Epidemic" (2003). Dementia is, however, only the tip of the iceberg when considered in the light of other age related diseases and critical care requirements which, consolidated together, drastically out demand projected levels of supply given current standards of care. As the largest demographic force the Western developed world has ever seen enters this 'expensive' zone, the question of how governments intend to compensate for such age related resource dependencies in light of already diminishing labour markets remains speculative. Answers popularly come in the form of arguments for increasing levels of immigration, yet as Australian population projections suggest, immigration beyond current levels would have a diminishing impact on retarding the ageing of the population given most migrants who enter Australia will themselves be part of the aged population in 30 to 40 years time (Department of Immigration and Citizenship, 2009). Furthermore, population projections suggest that changes in fertility rates would have a more significant impact on the constitution of population age, however this seems highly unlikely given the current rates of reproduction in women which are diminishing due to economic pressures and shifting social conventions (ibid.).

These dire prognostications, consisting of both shortfalls in the labour market size and skill, compounded by the increased labour resources required to care for and sustain the very population *creating* the labour shortfall in the first instance, has in the popular imagination manifested in terms not dissimilar to that of a natural disaster, with the popular media regularly referring to the world's ageing population as an *age-quake,* a *silver tsunami*, even "Boomergeddon" (Hamilton: 2008). Indeed, the so hyped health and longevity incentives for Boomers to maintain some commitment to workforce participation have in recent times hidden the biopolitical fragility that motivates much of the revision concerning Boomer maturation. There is however another crucial mitigating factor, and that is a burden shared by both Boomers and the biopolitic responsible for supporting them. That is, they can't afford to retire!

In Australia it was reported in 2004 that ageing Boomers and a falling birth rate could create a "population time bomb within two generations, blowing a $90 billion hole in the budget by 2052" (Hughes, 2004: 1). This figure is made even more catastrophic in light of the estimated shortfall in national savings for retirement through superannuation contributions, which amounts to a massive $600 billion, an amount larger than the then (2004) stock of superannuation savings (ibid.). Similarly in the UK, reduced numbers of people making long term savings toward retirement poses a serious risk for governments and financial institutions. Recent estimates of the UK government's liabilities for public sector pensions are in the region of 700 billion pounds (Inman in Gilbert, 2006), while Cairncross declares that the Organization for Economic Co-operation and Development (OECD) estimates of pension costs in the world's richest countries will amount to 3% of GDP by 2050 (2004). It is important to note here that these figures were generated prior to the effects of the so called 'Global Financial Crisis', beginning in mid 2007, which has seen stock prices diminished to as little or less than 40 percent of their pre-crisis peak in early 2008. Critically, this

development is of enormous significance to Boomer populations who hold substantial investment in these systems, indeed, whose very future is bound up in the success of such operations. As Neilson points out:

> *Many governments have introduced measures that require or compel retirement saving, predominantly through investment on global financial markets ... the result is a massive increase in the total asset holdings for retirement purposes ... Blommestein points to a threefold increase in the financial assets of OECD pension funds in the period 1990-98, making them the largest stakeholders in the global financial system* (Blommestein: 2001).

> *Not only has there been a growth in the overall size of pension assets, but there has also been a shift in the investment allocation of such funds toward higher yield, riskier assets such as equities* (Neilson, 2006: 156).

The ongoing effects of superannuation savings within the current global financial turmoil are yet to be seen, but as financial commentators all agree, the world has not seen a recession of this magnitude since the great depression of 1930, if not in the history of the developed world. The uncertainty that plagues the financial system – charged with the task of ensuring the future of retiree savings – further compounds the question of how Boomers, and the governments burdened with the responsibility for supporting them, will fund their later years, in particular the lifestyle excesses that Boomer populations have grown accustomed to.

Refiguring the "Third Age"

An emerging trend in this equation (one covered more extensively in the following chapter) is the way governments are strategising measures that minimise the impacts of ageing populations by distancing themselves from the liability of supporting and maintaining them. British sociologist Tony Gilbert's (2006) documentation of the UK experience is the most comprehensive analysis of the way Western developed countries are beginning to negotiate these issues. Using Peter Laslett's (1996) conceptualisation of the life course model, based around the 'four ages' (the first being childhood learning, leading to employment, productivity and reproduction, followed by a third age of leisured retirement, before the fourth age of dependency prior to death), Gilbert's analysis reveals how the so called 'third age' is being reconsidered in the light of emerging challenges given the disproportionate number of persons ageing due to the Baby Boomer demographic anomaly, and what governments, specifically the UK government, are doing to compensate for the perceived 'crisis' that will accompany it.

In Laslett's model the advancing economic and technological capacity of Western society in the latter decades of the 20th Century produced the 'third age'. The significance of this 'third age' was that for the first time in human history, those who had worked the majority of their adult lives could come to expect a period of health, wellbeing, and importantly, financial independence at the end of their productivity period before the onset of the 'fourth age', that being debilitation, senescent decline and death. The 'third age' emerged largely due to economic circumstances prevalent in the 1980s and 1990s (an oversupply in the workforce produced by the maturation of the Baby Boomer cohort into the second stage of life), that allowed older workers the opportunity to retire early on occupational pensions. Naturally the entrepreneurial

sector stepped in to exploit the bonanza of profit opportunities that ensued, providing leisure-rich, fiscally secure retirees with a suite of lifestyle and commodity options to fill the void created by early retirement. Despite this golden age of excess money coupled with surplus time, according to Gilbert, today the ageing of the population in the UK is exerting:

> *growing pressures provoking governments, financial institutions and employers to respond to the idea of the 'third age' as a risk ... the discursive sequence of the 'third age' is being reconfigured. Discourses are being deployed to change people's future expectations concerning work, retirement and pension provision as the process of governmentality progressively shifts the risks associated with retirement from the state and other institutions to individuals* (Gilbert, 2006: 82).

In 2002 the Department of Work and Pensions in the UK produced the Green Paper '*Simplicity, Security and Choice: Working and Saving for Retirement'* (DWP, 2002). Cairncross analyses this document in terms of its revision of pension provision and notes the increased emphasis on choice and market solutions. Such a shift seeks to extend working lives and reconfigure the relationship between pensions and retirement, a trend that is emergent throughout government policy in the US, continental Europe and across the remainder of the developed world (Cairncross, 2004). According to Gilbert these proposals not only reverse the trends for early retirements seen throughout the 1980s and 1990s, that largely contributed to the emergence of the 'third age', but also will in effect reduce the time available for any 'third age' to occur (2006: 84). The increased fiscal contributions through delaying pension provisions and the maintenance of tax payments assists in making pay income tax work to displace much of the burden on governments. According to Cairncross, raising entitlement age for state pensions by three years produces a saving between a quarter and one third of the savings on social security budgets (Cairncross, 2004). Smith and Clurman concur:

> *By working longer, Boomers will ease pressures on governmental programs. Longer working years for Boomers would mean more social security contributions, postponements of claims against social security and medicare, and more income tax revenue. That combination would substantially ease the projected strains on these programs and on federal and state budgets ...* [In the US] *[s]ome economists estimate that raising the age for social security benefits by three years would erase projected benefits in that system for the next 75 years ... Boomers who work longer would remain highly active consumers for many more years, thus adding to overall economic vitality and growth* (Smith and Clurman, 2007: 51).

Across all OECD countries plans are already in place to raise the retirement age (and the point at which one can access their superannuation savings) to 67. As a forecast of things to come, the Pensioners Association of Australia declared as recently as September 2008 that they would, after initially rejecting the proposal, support the establishment of the official retirement age in the coming decades at 75, though this has come under heated debate (Heathcote, 2008). Such vehement objection to the changing of the status quo of retirement in Western developed countries is best exemplified by the 'events' in France, exactly 35 years after May 1968, where hundreds of thousands of people took to the streets of Paris in May 2003 to object to

the French government's decision to amend pension policy, requiring workers contribute for longer before qualifying for benefits (Neilson, 2006: 156).

Contrary to the precedents established in the 1980s and 1990s, increasingly, the 'second age' as identified by Laslett (1996) is ever more extended towards and into the seventh decade of life. In practice this removes between ten and fifteen years of life from the 'third age'. This tendency is congruent with the trend identified by Smith and Clurman that Boomers not wanting to grow old seek to create a category of self perception that is "middle ageless" (2007: 35-37), suggesting that on a social level at least, Gilbert's analysis (2006) is not only a necessary biopolitical move by Western governments, it is also desired and sought after by many members of Boomer populations themselves.

An issue critical to this discussion and one central to the argument of this thesis that has received little if any attention in the literature surrounding ageing and retirement specific to Boomer populations, is the question of how long individuals anticipate that retirement to be? Given the Boomer penchant for excess it is difficult to envisage them curtailing their consumption patterns during retirement, if not accelerating the rate at which they will do this, given the increasing demands that ageing bodies and pre-dispositions create. According to a US survey, 60 percent of Boomers will need to work just to maintain 80 percent of their current consumption, and more than 40 percent (29 million) will be working at age 65 – whether they like it or not (Court, Farrell and Forsyth, 2007: 1). However, the critical factor overlooked in this equation (and, depending on the perspective from which it is viewed, this can be both a cause for concern and/or celebration) arises when calculating how much superannuation individuals will need to accumulate to support themselves throughout retirement. When planning retirement, individuals need to determine what sort of income they will require to both maintain a standard of living similar to that currently enjoyed, and that compensates for increased age related expenses such as medical fees and home support and care, to name only two volatile financial variables. However, the most important variable to be considered in the context of this argument concerns the time frame around which an individual can expect to live. Given that we are now entering what many describe as "the biological century" (Rabinow and Rose, 2003: 3), life expectancy becomes a telos increasingly subject to a scientific gaze bent on its postponement, and therefore, its *uncertainty*, given the interrogations, applications and feverish entrepreneurial investment, promoted biopolitically, to radically extend it.

Life Expectancy

The population of those 80 and over is the fastest growing group in the developed world, with those aged over 65 anticipated to increase from 249 million in 2000 to 690 million in 2030 (Nass, 2004: 1). This statistic is reflective of the dramatic increase in life expectancy (in the developed world) over the last 100 years. In Australia this was 57 in 1908, but was closer to 80 in the year 2000 (ABS, 2005: 2) (Australia in this respect more or less reflects most other developed countries). According to popular Australian demographer Bernard Salt, "Baby Boomers do crib an extra few years of life because of better health care but they do die and they die off in droves in the 2020s, dragging this nation from the natural increase to natural decrease in the middle of the 2030s" (Salt, 2005: online). After speaking with Salt in

2004 and questioning his estimation of whether or not people – Boomers in particular – will be living longer lives in the coming decades due to advances in the molecular life sciences, he emphatically and unequivocally disagreed that they would (B. Salt, personal communication, November 1, 2004). As the arguments made in the following chapters will attest, the way Boomers come to plan their retirement incomes now (the total amounts of which are pre-determined), will largely be made according to their anticipated longevity, a longevity I argue is contested by the discourses (and concomitant expectations) emerging from the molecular life sciences.

The question concerning retirement is a fertile place to begin this analysis. In Australia the current retirement age of 65 was fixed in 1908. In 1908 however, life expectancy was only 57 years. If one were lucky enough to make it to retirement age it was certainly deserved! A century later, life expectancy in Australia is now roughly 81 (83 for women and 79 for men), with retirement age still standing at 65. We have come to expect retirement at this stage in life as something natural and given; however, it is a fiction, that is, a cultural construction that is clearly anachronistic and drastically in need of revision. In the last decade alone (1996 to 2006) "life expectancy at birth has increased by around two and half years for males and females, reaching 78.7 years for males and 83.5 years for females in 2006" (Department of Immigration and Citizenship, 2008: 2). If we take even the most conservative estimate of increased longevity over the next twenty years we see at minimum an incremental rate of increase of around five years. That means that in 2028 even the oldest Boomer male amongst us can expect to live until he is at least 84, 88 if you're a woman! My argument here is that the improvements in nutrition, water purity and developments in medicine and public health – and now the accomplishment of disease prevention – all entail not so much a pursuit of 'life extension' in the strictest sense, but more so strategies to 'compress morbidity'. In the coming decades we will see the ever encroaching world of molecular medicine appear as a genuine method of life extension that could take this expectation well above and beyond what is perceived as its 'natural' upper limit (Duke, 2002).

This thesis argues that it is revealing of a lack of genuine foresight that estimates do not factor into account further developments in longevity medicine that, given the empirical possibilities of increasing average life expectancies, could continue to kickback the anticipated date of expiration, and more importantly, significantly improve the quality of ageing life over the coming 20-40 years. Given the shape of demographic markets, that through demand, largely determine the kind of science that is produced (Kuhn, 1962), the coming chapters of this thesis will argue that a suite of emergent elements converge upon life extension as a salient and realisable goal for ageing Boomers *and* the generations that follow them. The purpose of the first part of this thesis is to claim that such increases in longevity are not just probable, but likely, and should be at the forefront of forecasting strategies, policy formation, and individual negotiation and engagement, especially for those individuals (Boomers in particular) who are poised on the cusp of such developments.

Conclusion: A Booming Industry

The changes in attitudes and understandings of ageing and aged experience analysed herein are not simply the result of an ageing population's needs and desires, but the involvement of an entire apparatus of both public and private interests that serve to

both provide for this population and at the same time feed off it. In order to understand this speculative proposition more coherently I will now provide a detailed sketch of how emerging trends in neo-liberal governmental policy effectively create, through the relinquishment of control and responsibility, what it is that Boomers can come to expect and experience in the coming decades. This discussion will centre around an analysis of the concepts of 'biopower' and 'biopolitics', terms originally coined by Michel Foucault, that track and lend insight to the shift from state provision to entrepreneurial opportunism in recent times, and how these shifting cartographies of biopower and biopolitics lead to what I speculatively suggest is an era of 'immortalist biopolitics'.

Chapter 3: Biopower and Biopolitics

As reviewed in the previous chapter, the growing burdens on governments to accommodate and cater to ageing populations is an inevitability that is receiving increasing attention across a range of fronts. As a way of comprehending the intricacies of this complicated scenario that hinge on a relationship (increasingly a 'contract') between the state and/or non-state actors and the individual, I will apply Michel Foucault's twin concepts of 'biopower' and 'biopolitics' as a way of framing this emergent scenario, and to chart the ways in which it has and will continue to change. This chapter will analyse the emergent discourses of neo-liberalism and globalisation particular to the context of ageing populations in developed countries, and will reveal how the state appears to be employing strategies that would alleviate it from the burden of such populations by withdrawing itself from the responsibility for them. Such a withdrawal has profound implications for both the entrepreneurial sector charged with the task of compensating for that withdrawal, and for the individuals subject to a reconfiguration of these relationships that are now increasingly subservient to the dictates of a profit driven private sector exploiting the opportunities afforded by a culture of 'risk' management. What this scenario produces is a 'nascent' potential I speculatively identify as 'immortalist biopolitics'.

Historical Review of Biopower

Foucault roughly sketched his concept of 'biopower' in six pages titled "Right of Death and Power over Life" toward the end of the first volume of *The History of Sexuality: The Will to Knowledge* (2008) (originally published in 1976 in French as *La volonté de savoir*). Despite the unfulfilled promise of Foucault to devote a large part of his never completed six volumes (he finished three) of the *History of Sexuality* to the concept, biopower has nevertheless become one of the key critical frameworks through which the relationship between the ruling state and its population can be understood and interpreted. Apart from the brief attention paid to it in Foucault's 1976 lectures *Society Must be Defended* (Foucault, 2003), biopower remains an underdeveloped concept, yet it is one still taking shape posthumously as a range of high profile scholars apply its analytical usefulness to continually evolving contemporary conditions. Biopower's continuing legacy and enduring applicability in identifying, mapping and analysing the emergent cartographies of population and governmental control is testament to Foucault's far reaching insight and analytical prescience. It is for these reasons that I have chosen to use biopower and biopolitics as the platform for understanding, interpreting and later *intersecting* the aleatory cultural conditions that come to define both present and future circumstance.

Biopower has in recent times experienced an increasing exposure given its usefulness in mapping our collective entry into the so called "biological century" (Rabinow and Rose, 2003: 3), where humanity, both as individuals (the anatamo-politics of the human body) and as a collective (the species population) are poised on the cusp of momentous changes as a result of rapid developments in the life sciences. Though problematic in its unfinished form, the concept of biopower remains vital to what this thesis argues is a critical intersection of a mutually convergent and critically 'emergent' cultural, economic and techno-scientific circumstance. How this convergence/emergence impacts upon ageing and aged experience, and importantly the 'expectations' associated with ageing, is the core concern of this investigation.

Anglo Neo-Foucauldian scholars Paul Rabinow and Nikolas Rose suggest biopower:

> *serves to bring into view a field of rationalised attempts to intervene upon the vital characteristics of human existence – human beings, individually and collectively, as living creatures who are born, mature, inhabit a body that can be trained and augmented, and then sicken and die as collectivities composed of such living beings* (Rabinow and Rose, 2003: 2-3).

These 'interventions' operate in a double sense. On the one hand biopower focuses on the "anatamopolitics" of the human body, that of the individual, which seeks to optimise its potential via the integration of it into "efficient systems" (ibid.: 2). On the other hand biopower focuses on the "species body", that being the 'biopolitics' (biopolitics being the strategies used to serve these ends) of the population as a whole, that regulates groups in terms of their basic biological processes, namely "birth, morbidity, mortality, longevity" (ibid.: 2). Critical to an understanding of the historical emergence of biopower are how these interventions have switched over time from methods exercised originally as the right to determine and administer death, to a concern with the maximisation of the processes of life.

Originally biopower was exercised through the juridical form of sovereign power or monarchic rule whereby rulers possessed the right to 'seize' things. Seizures include 'time' through incarceration, 'bodies' through warmongering and/or ultimately, 'life' itself through execution. During the 17th and 18th centuries however, the sovereign ruler was displaced as the dominant ruling body by the nation state, which in turn became more involved with the exercise of power not through the termination of life, but the *maximisation* of it. It is here, argues Foucault, that we witness the introduction of 'life' into history, where "Western Man gradually learns what it means to be a living species in a living world, to have a body, conditions of existence, probabilities of life, an individual and collective welfare, forces that could be modified" (Foucault, 1984: 264). For Foucault, this introduction of life into history represents a unique and unprecedented moment in the chronology of human existence, for it enables the possibility of a new ontology to be developed using the body and its 'potential'. It provides for the subject the possibility of freedom from the hierarchical constraint of a power that during the reign of sovereign rule presented the spectre of death (and limitation) front and centre in the administration of existence. From the 18th century on these new forms of biopower begin to open the possibility for individual empowerment, tangled and enmeshed in a web of relations that are unstable and forever shifting, which for Foucault is precisely the point of opportunity that opens the potential for individual freedom to exist. To denote this shift Foucault created the neologism "biopolitics".

"Biopolitics", according to Rabinow and Rose, are "the specific strategies and contestations over problematisations of collective human vitality, morbidity and mortality, over forms of knowledge, regimes of authority, and practices of intervention that are desirable, legitimate and efficacious" (2003: 3). Neilson describes them more simply as the "integration, at the beginning of the modern era, of life itself into the mechanisms and calculations of power" (2006: 155). Biopolitics are the micro processes of power operating within the larger macro operations of biopower, mobilised by the various apparatuses of the state that emerge in the complexification of social relations that delegate the administration of biopower to

smaller and smaller units of classification and dissemination. These 'macro' and 'micro' aspects of biopower/biopolitics refer also to the practices between the previously mentioned 'poles' of biopower, that being between the level of population groups and that of the individual. Rabinow and Rose apply these terms in an attempt to conflate them with the work of Foucault's friend and collaborator Gilles Deleuze, substituting "molar" for macro, and "molecular" for micro (2003: 15). In the era of the sovereign social state the molar was superior as a top down hierarchical distribution of power, however, more recently it is the molecular processes of biopower, the biopolitical, that have become the dominant measure of 'intervention', enabling (to varying degrees) a 'bottom up' resistance to the omnipotence of the original 'top down' power structure.

One way of explaining this development is via Foucault's concept of 'governmentality'. Foucault coined this term as a response to the emerging complexification of his thesis as he moved in his analysis from the classical age through to the early modern period. As Rabinow and Rose interpret it:

> *Whilst initially linking biopolitics to the regulatory endeavours of developing states* (2003: 250) ... [Foucault] *recognises that "the great overall regulations that proliferated throughout the 19th century ... are also found at the sub-State level, in a whole series of sub-State institutes such as medical institutions, welfare funds, insurance and so on"* (2003: 250). *This is the point at which Foucault begins to develop his concept of "governmentality" to encompass the variety of ways of problematising and acting on individual and collective conduct in the name of certain objectives which do not have the State as their origin or point of reference. And as he develops this line of thought, he distances himself from the view that such power over life is unambiguously nefarious. This is also the turning point that leads Foucault to a fascination with ancient modes of subjectification and the possibilities of freedom ... as the Greeks would have it, a flourishing life* (Rabinow and Rose, 2003: 7).

Further conflating the work of Deleuze with Foucault, Rabinow and Rose argue that biopower is in fact a "plane of actuality" (2003: 3). This "plane" must include three critical elements, the first being that there must be one or more "truth discourses" about the vital characteristics of living human beings; the second that there are "strategies for intervention" upon collective existence, that is 'populations' (the molar) in the name of "life and health"; and thirdly "modes of subjectification" through which individuals (the molecular) can employ measures that entail a "practice of the self" (ibid.). Within this practice of the self the possibility for a 'care of the self', as it was practiced in ancient Greece, is enabled, opening the opportunity for individual resistance and empowerment within the overarching spectres of biopower/biopolitics. The care of the self is critical to the arguments that follow in the second half of this thesis, constituting a large part of the arguments made in Chapter 6, 'The Artist as Agent of Future Construction'.

I will now apply the terms biopower and biopolitics to the newly emergent circumstances of the 21st century that, although "nascent" (Rabinow and Rose, 2003: 29) in many respects, impact heavily upon our epistemological understanding of life and concomitantly the way it is lived ontologically as an exercise 'in anticipation'. These rapid changes taking place are not merely reflective of, or reactive to, such (nascent) developments, but rather are *pre-emptive* of them. The new "cartographies

of biopower" (Lazzarato, 2008: 1) complicate Foucault's original thesis in unprecedented ways that he could never have anticipated or imagined given the claims of their extraordinary potential (Waldby, 2005; Neilson, 2006). I map these developments first via an analysis of the way the medicalisation of knowledge produces the biopolitical framework that institutionalises the government of life, establishing the epistemological and ontological basis upon which human beings can come to understand, know and act upon themselves. I then employ Nikolas Rose's seminal analysis of the three predominant configurations of biopolitics in the 21st century as a scaffold upon which to situate the implications for ageing populations, and the potential ramifications for the remainder of society who follow in their wake. The analysis that stems from this framework will necessarily expose the momentums and forces that act upon ageing and aged experience in the 21st century, and constitute the core assumptions upon which this thesis stakes its claims.

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As demonstrated earlier in this chapter, since the 19th century the exercise of biopower has been increasingly fragmented into micro political strategies, into biopolitics that come to form a process of governance that is, through the various apparatuses of biopower, panoramically disseminated and distributed biopolitically in increasingly deregulated ways. As Rabinow and Rose argue:

> *States can rule only because of the ways in which they have managed to connect themselves up to these apparatuses, which have their own logics and viscosity which, so long as regimes aspire to liberalism, exercise demands and constraints on central powers* (Rabinow and Rose, 2003: 13).

This emergence of biopolitics within biopower has been contingent upon a concurrent development of knowledge, in particular the increasing power of the life sciences to understand and administer life in the name of optimising and maximising that life in terms of its vitality and longevity, as individuals (the anatamo-politics of the human body) and as a collective (the species population). The medicalisation of knowledge is the ultimate legitimating biopolitical tool in this sense, for it pertains to the very substance of life, making it 'the' principle site of biopolitical intervention. As identified by Rabinow and Rose:

> *Since the end of the Second World War, and taking here only the example of health, a range of powerful agencies within states and a range of trans-national bodies have taken on new importance. So have a host of bioethics commissions, regulatory agencies, and professional organizations: a whole bioethical complex in which the power of medical agents to 'let die' at the end of life, the start of life or in reproduction are simultaneously enhanced by medical technology and regulated by other authorities as never before* (Rabinow and Rose, 2003: 13).

In these contemporary configurations of biopower the optimisation and maximisation of life have become the dominant focus of such interventions, with the economy of contemporary biopolitics expressing a logic of vitality *against* mortality. Within this overarching discourse of vitality and life inducing promotion there are micro-political claims to life that see it emerging from the 'bottom up' – that is, biopolitics exercised in an opposite direction *from* the subjects of these interventions. In the interests of

'life promotion', individuals come to govern themselves within the sphere of governance not only as agents of the state, as mothers were considered in the 20th century, but as autonomous individuals who have a clear vested interest in the logic of life promotion. This has produced what Rabinow and Rose argue are "new kinds of patients groups and individuals, who increasingly define their citizenship in terms of their rights (and obligations) to life, health and cure", within which exist newly emergent "collective formations", as well as "new modes of individualization" and "autonomy" (2003: 13).

These newly emergent modes of bottom up biopolitical organisation began in the latter half of the twentieth century where developments centred around innovations in reproductive technology, in particular in vitro fertilisation (IVF). Here new cellular technologies took redundant reproductive agents (infertile mothers) and reversed their diagnosed infertility, turning it into a 'disease' to be treated, making it a "potentially remediable medical condition" (Rabinow and Rose, 2003: 21). 'Life' in this sense became something that could be engineered from the cellular level up, and thus subject to interventions that problematise what does and does not constitute life, or in this sense, 'new' life.

What is crucial to this new conception of life is not so much the biology of this new form of medicalised discourse, rather the politics of it, for the question as to who has the right to engineer such life is a decision increasingly displaced from the power of the state or the state apparatus to that of the needs and wants of the individual. As Rabinow and Rose argue:

> *The rhetoric of choice clearly resonates with the ethic of autonomy at the heart of advanced liberal modes of subjectification, and the transformation of infertility into a treatable illness exemplifies the re-imagining of human capacities as open to re-engineering and enhancement by medicine* (Rabinow and Rose, 2003: 22).

Therefore occupying this newly emergent biopolitical realm are not only the expansion of possible strategies for intervention in the promotion of life and its capacities, but concomitantly, a shift in the power of choice as to what, how and for whom these possibilities exist at the individual level. Given this set of circumstances that developed in the latter half of the twentieth century and have changed the fundamental poles upon which an understanding of biopolitics occurs, the question that must be addressed now is: how do recent developments in the life sciences (and the concurrent political interventions that accompany and determine the application of such technologies) impact upon the field of biopolitics, and importantly upon the individuals who live within these new sets of relations?

Recent developments in genomic and molecular medicine promise to change the course of human evolution via interventions that occur at the molecular level, interventions that will challenge the basis upon which our species understands and experiences itself. The question to be asked in this context is how choices regarding the use and application of these Promethean technologies are made, especially given the argument that such choices are 'produced' by the very nature of the technologies that come to define the field of biopower and biopolitics within which they operate? As this analysis will reveal, despite the supposed deregulation of such overarching

determinations in the era of the 'self-autonomous' individual, traditional hierarchies re-appear, albeit as a distant, silent agent within this complex web of power relations. Critical to this discussion is the way such complex operations impinge upon ageing and aged experience in ways that undermine the notion of self autonomy, prescribing for self-autonomy what the perceived 'freedom' to self-govern is.

The era of genomics saw biopower and biopolitics enter a new phase in the medicalisation of knowledge, one that threw open the possibility of personal transformation. However, at the same time such knowledge forecloses on the individual's ability to practice self autonomy within that sphere of influence (Rose, 2001; Murray, 2007). Traditionally, medicine focused on the treatment of illness as it appeared, however in the era of genomics the logic of 'prevention' becomes more prominent in its governance of what this emergent medical knowledge can 'intervene' upon. As new forms of knowledge in this domain continue to be developed at an accelerating pace, we see conclusions formulated that are based on probability – that is, ways of calculating 'risk' that pre-empt certain medical conditions or manifestations that can be intervened upon in the present using 'preventative' measures. As Rabinow and Rose suggest, genomic science "seeks not to pronounce on destiny *per se* … but rather to render the future as probabilistic and thereby open it up to technical intervention" (2003: 33).

It is this 'probability' that comes to form one of the more significant developments in biopolitics of recent times, a manifestation that establishes a mandate to pre-emptively determine the future and act upon it in the biopolitical interests of optimising and maximising life. For the epistemology and ontology of aged and ageing experience (and critically the 'expectations' associated with ageing), such developments are and will continue to have a monumental impact, and constitute for this thesis the empirical basis of the arguments to follow: that such technologies pre-emptively prescribe how ageing individuals will act – actions that qualify, I argue, as pre-cursors to a 'trans' and/or 'post' human threshold.

To understand this argument in greater detail I will use Nikolas Rose's seminal 2001 article *The Politics of Life Itself* as a framework for cataloguing these emergent developments. Here Rose describes how new configurations of biopolitical control govern and coordinate the management of life in three distinct ways; how the biopolitics of "risk" management, accentuated by the advent of a (nascent) "molecularisation" of life, has in turn produced a new form of biopolitics in the form of "ethopolitics", the emergent rights of consumer groups.

The Biopolitics of Risk

Though the state still holds the responsibilities it inherited from the displacement of the sovereign system over two centuries ago, primarily to ensure the general conditions for the health of populations, Rose argues that the contemporary manifestations of biopower are engaged in a process of withdrawal from this agenda as it attempts to free itself to varying extents from these responsibilities and obligations, a view supported by Waldby (2005) and Neilson (2006). The neo-liberal state has managed to do this via the delegation of such authority to various

entrepreneurial schemes that step into the breach. As Rose argues, the new 'will to health' is:

> *increasingly capitalised by enterprises ranging from the pharmaceutical companies to food retailers. And a whole range of pressure groups, campaigning organizations, self-help groups have come to occupy the space of desires, anxieties, disappointments and ailments between the will to health and the experience of its absence. Within this complex network of forces and images, the health related aspirations and conduct of individuals is governed 'at a distance' by shaping the ways they understand and enact their own freedom* (Rose, 2001: 6).

According to Rose, both state and non-state actors "identify, treat, manage or administer those individuals, groups or localities where risk is seen to be high" (2001: 7). Similar to the previous discussion of genomics which uses 'risk' as the basis for pre-emptive strategies that displace or avoid unwanted, unproductive or senescence accelerating behaviour, risk here comes to constitute a panorama of thought and action that involves "calculations about probable futures in the present", followed by "interventions into the present" (ibid.: 7). Such risk avoidance is exclusively for the purpose of ensuring that the future is delivered the highest chance to optimise and maximise the processes of life, processes that are increasingly governed not by mere circumstance or lifestyle factors, but by an understanding of life at the molecular level. The implications of this development for ageing populations, arguably the most *at risk* members of society in this context, are profound, as the following chapter reveals.

The Biopolitics of Molecularisation

The second element in Rose's contemporary biopolitical analysis is that of molecularisation. As he states, "We are in a world of 'post-genomics', where the key processes are those of gene expression and their regulation" (2001: 14). In the second half of the twentieth century Rose argues that knowledge of life and the living process became known through techniques and applications that could re-engineer that life – where the 'truth' discourses as to what constitutes a human being in turn become inextricable from the technological mediums that produce them:

> *All those projects to transcribe 'the book of life', to decode 'the code of codes', to work out its 'normal' and its pathological lines, words, chapters, have been linked to endeavours that intervene upon life at this molecular level – not after the event but in the very process of discovery itself ...* [In this way] *"the laboratory and the factory are already intrinsically interlinked ... It is not just that such companies seek to 'apply' or 'market' scientific discoveries, they shape the very direction, organisation, problem space and solution effects of the biology itself* (Rose, 2001: 14-15).

Critical to this discussion is the way that the construction of knowledge in the life sciences in complicit with the entrepreneurial interests that seek to exploit that knowledge for the purposes of generating market share and maximising profit. In this new biopolitical realm where the state is increasingly withdrawn from the 'direct' governance of its subjects, the vacated space becomes compensated for by private/corporate interests. This alternation provides private/corporate industry a

unique opportunity to exploit the biopolitical mandate of 'optimising' and 'maximising' life, translated in entrepreneurial terms as the opportunity to simultaneously optimise and maximise profitable returns. As Rose argues:

> *Hence the politics of the life sciences – the politics of life itself – has been shaped by those who controlled the human, technical and financial resources necessary to fund such endeavours ... Neither the production of truth nor even the production of health is now sufficient to move the 'venture capitalists, patent offices, and science writers on whom [the life sciences] are increasingly dependent': they must be legitimated by the logics of product development and market share (Rabinow, 1996: 137). Biopolitics becomes bioeconomics, driven by the search for what Catherine Waldby has termed 'biovalue': the production of a surplus out of biology itself (Waldby, 2000: 19)* (Rose, 2001: 15).

This emergent scenario within the arena of biopolitics creates a peculiar situation whereby the benchmarks of what we understand humanity to be, the very commonality of our shared biological inheritance, is made redundant given that these 'normative' parameters that define the species are now subject to the scrutiny of the molecular apparatuses of biopower that designate such characteristics as plastic and therefore malleable. Rose cites conditions in domains such as the psychiatric (depression/psychosis), the sexual (impotence) and ageing (senescent decline) as potentially remediable medical conditions treatable by anti depressants (Prozac/Zoloft), by sexual enhancement (Viagra) and anti-ageing drugs (Hormone Replacement Therapy), as examples of how natural and/or biological processes have become, as in the case of reproductive disorders previously mentioned, 'diseases' that are treatable and to varying extents, curable (2001: 16). As Rose emphatically attests: "Existence is being lived according to new coordinates, a new game of life is now being played" (2001: 16) where "natural life", what was previously understood as a given inevitable, "can no longer serve as the ground or norm against which a politics of life may be judged" (2001: 17).

The implications of this contemporary biopolitical manifestation for the demographically disproportionate number of aged and ageing populations in the Western world, those that now represent a lucrative source of revenue for private entrepreneurial interests, are profound, and as I argue below, 'species defining' in terms of the scale and scope of what such a coupling could produce. Prior to addressing this however, I will present one final dimension identified in Rose's emergent biopolitical schema that optimistically suggests there is a measure of flexibility, even individual empowerment, within this scenario, what Rose identifies as "ethopolitics".

Ethopolitics

According to Rose the 'will to health' established in the second half of the 20th century, sought not only the minimisation of risky behaviour that could lead to premature illness and death, but also the campaign for an 'active lifestyle' idealised in the portraiture of the 'ideal life' that could be lived corporeally, ideologically, even spiritually. Such an idealisation promoted the physical and personality traits of "well-being", "beauty", "success", "happiness" and "sexuality" (2001: 17), to name a few.

Central to this newly emergent field of prescribed self governance is the contestation of the body – what it is, what it does, and who owns it. As Rose argues:

> *Selfhood has become intrinsically somatic – ethical practices increasingly take the body as a key site for work on the self. From official discourses of health promotion through narratives of the experience of disease and suffering in the mass media, to popular discourses on dieting and exercise, we see an increasing stress on personal reconstruction through acting on the body in the name of a fitness that is simultaneously corporeal and psychological* (Rose, 2001: 18).

In an earlier articulation of the idea, Novas and Rose refer to this as "somatic individuality" (2000), though Turner first applied this concept in sociology to populations in what he termed "somatic society" (1992). This newly emergent somatic identity embraces "the new genomic and molecular vocabularies of ourselves" (Rose, 2001: 18), what Rose defines as "ethopolitics", the "self-techniques by which individuals can observe, analyse and identify themselves", thus enabling a perspective upon which to "act upon themselves to make themselves better than they are" (ibid.: 18). Rose contends that ethopolitical concerns embody 'vitalist' discourses that enable individuals to choose, as a discipline of self-governing autonomy, the right path or passage to health they consider optimal – that is, one that will optimise and maximise the terms of their existence. The irony apparent is that despite the growth of positivism as a result of the life sciences' increasing ability to determine human epistemology and therefore ontology, there is this equal and opposite 'vitalist' resurgence that exerts a measure of individual and collective empowerment from within, a nurture *within* nature that has the potential to override positivist determinations. As Rose explains it:

> *While many critics see the new biomedicine as individualising, we can already see new forms of collectivisation emerging ... 'at risk' individuals are joining into groups and organizations, not merely demanding public provision and rights, but making their own claims on the deployment of biomedical technologies and the direction of biomedical research ... On the one hand, our very personhood is increasingly being defined by others, and by ourselves, in terms of our contemporary understandings of the possibilities and the limits of our corporeality. On the other hand, our somatic individuality has become opened up to choice, prudence and responsibility, to experimentation, to contestation – and so to a 'vital politics'* (Rose, 2001: 19).

This acknowledgement of an apparent collective and individual vitalism that operates as a form of empowerment within the overarching discourse of biopolitical positivism is a central fulcrum upon which the arguments of the first part of this thesis are hinged. Though in many ways the future of aged and ageing experience are dictated by the newly emergent, molecular (positivist) biomedical discourses, this thesis seeks to promote such strategies of creative freedom enabled through the emergence of such a vitalist *ethopolitics*. To begin this process I now apply Rose's three dimensions of contemporary biopolitics to aged and ageing experience in the 21st century.

Chapter 4: The Biopolitics of Ageing

The dream – of doctors, geneticists, biotech companies and many 'afflicted individuals' and their families – is of that pre-symptomatic diagnosis followed by technical intervention at the biological level to repair or even improve the sub-optimal organism ... the biological risky or at risk individual, once identified and assessed, may be treated or transformed by medical intervention at the molecular level … the line of differentiation between interventions targeting susceptibility to illness or frailty on the one hand, and interventions aimed at the enhancement of capacities on the other, is beginning to blur (Nikolas Rose, 2001: 21).

As an official member of the Baby Boomer Generation, I really and truly do not believe that it was intended for us to die. Death, if and when it occurs, will clearly represent a mistake of some kind (Terry Grossman, 2000: 3).

The reason I will always fear my death is my passion for life, and the reason I will never have enough time is that I cannot have forever (Letty Cottin Pogrebin, 1996: 303).

Do not go gentle into that good night, Old age should burn and rave at close of day, *Rage, rage against the dying of the light* (Dylan Thomas, 1951).

No one wants to die (Steve Jobs, 2005).

This first part of thesis is based on the nexus between disproportionately large ageing populations in Western developed countries who, as subjects of the biopolitical mandate of 'self autonomy' produced by the state withdrawal of responsibility for these populations, now find their futures governed by the prescribed 'freedoms' provided by free market entrepreneurial opportunism that has stepped into the breach to compensate for the state withdrawal from this sphere. The insurance mechanisms that mediate between these two remaining parties increasingly demand 'pre-emptive' action to avert anticipated biological crisis (risk), creating in effect the marketisation of health that frames the process of ageing as no longer a natural inevitability but as a 'disease' to be cured. This convergence of forces creates profound implications for ageing populations, and sets a powerful precedent for the remainder of society that follows in their wake. I will now proceed to flesh out this argument using Rose's three distinct dimensions of biopolitical emergence in the 21st century.

Risk and Ageing

In 1994 the World Bank delivered the report *Averting the Old Age Crisis: Policies to Protect the Old and Promote Growth* (World Bank, 1994). Produced as a response to the ageing of the disproportionately large Baby Boomer demographic bulge in Western developed countries, the report issued a mandate for such nations to 'pre-empt' what it perceives as an impending crisis by employing policy initiatives to displace the 'risk' associated with such populations by minimising the severity of the burden upon the state. As the introduction to the report indicates:

As we grow old we work, produce, and earn less, and therefore need a secure form of income to see us through life. Societies and governments have

> *developed mechanisms to provide income security for their older citizens as part of the social safety net for reducing poverty ...* [however] ... *[t]oday, as the world's population ages, old age security systems are in trouble worldwide. Informal community and family-based arrangements are weakening. And formal programs are beset by escalating costs that require high tax rates and deter private sector growth – while failing to protect the old. At the same, many developing countries are on the verge of adopting the same programs that have spun out of control in middle and high income countries* (World Bank, 1994: 1).

As the following arguments demonstrate, 'risk' is the critical adjective in the motivation for these warnings, for as Rose argues in the previous chapter, the biopolitics of risk governs not only state action but more importantly, the trajectory of individual lives via the notion of 'self autonomy', implemented by the state as a way of displacing risk *from* the state *to* the individual. As the following analysis reveals, 'self autonomy' is in fact a paradox given the increasingly prescribed forms of behaviour and ontology such 'autonomy' creates.

The World Bank's designation of 'risk', or more accurately, 'risk management' as a crucial taxonomic and organisational discourse, is reflective of broader bureaucratic trends over the past half century that can be identified as 'liberal' – or more contemporaneously – 'neo-liberal' in orientation. In this regard the World Bank's action can be seen as a further culmination of what Foucault originally identified as central to the contemporary charter of biopolitics – that being the inevitable movement toward the neo-liberal agenda of individual autonomy performed through state deregulation. As argued by Patton, Foucault suggests that liberalism:

> *formed the historical framework, the system of government reason, within which the techniques of biopower would be deployed ... liberalism is presented as a distinct practice of government defined above all by its acceptance of the idea that society and its economic processes follow laws of their own which governments must understand and respect ... Against the idea that the population was in need of detailed and constant regulation, liberalism advanced a conception of society and the economy as naturally self regulating systems which government should leave alone* (Patton, 2004: 7).

Foucault saw in the logics of laissez faire free market capitalism that forms of biopower, as inherited from the sovereign age, would ultimately yield to biopolitics, the fragmentation (via deregulation) of biopower (Lazzarato, 2008). He further identified that this process is one increasingly distributed via the locus of the individual itself who would become responsible for his/her own conduct and behaviour 'within' the overarching discourses of the free market. Indeed, the formation of citizenship in such neo-liberal societies is predicated by the free market mechanisms that necessarily entail the conflation of the social, the political and the legal with the logic of neo-liberal economic rationalism. As Lemke points out, neo-liberals "transpose economic analytical schemata and criteria for economic decision making onto spheres which are not, or certainly not exclusively, economic areas … [they] ... attempt to redefine the social sphere as a form of the economic domain" (Lemke, 2001: 197).

Critical to the focus on aged and ageing populations are these economic "schemata" and "criteria" that designate what individual freedom is. The deregulation inherent in neo-liberal political strategy necessarily involves individual participation in the logics of profit and loss, efficiency, 'diminishing' (ageing) returns, and factors that threaten the 'optimisation' and 'maximisation' of profits. Deregulation in neo-liberal societies therefore entails not only individual participation in these systems, but concomitantly, the responsibility for the management and administration of the individual's own risk – both behavioural risk and the risk inherent within each individual's biological predisposition. In addition to the way Ericson suggests that "[e]ach individual is to be his or her own political economy, an informed, self sufficient consumer of labour markets, personal security markets, and other consuming interests" (Ericson, 2000: 533), individuals are also held responsible for their relationship to the powers of the market as a burden or risk to it, as a potential 'diminishing return' (especially in terms of ageing), just as any other object within what Jean Baudrillard identifies as a "system of objects" (1988), the economic reduction of all components of that system to their exchange value.

This process of state withdrawal from health provision in recent times has been steady and consistent. As argued by Waldby:

> *The post-war consensus in favour of public, comprehensive health care provision was challenged by neo-liberal advocates like the World Bank, which argued in a series of reports* (World Bank 1987, World Bank 1993) *that governments should encourage the identification of for-profit health services, and shift service provision from the public to the private sectors. Since the mid 1980s, many countries in both the developed and developing world have seen a decrease in public expenditure on health as a percentage of GNP* (Brugha & Zwi, 2002) *and/or the marketization of health services not provided, or inadequately provided, through the public sector* (Kumaranayake and Lake, 2002) (Waldby, 2005: 4).

The domain of health is thus displaced from being a social issue of health to an economic issue of financial risk. The process begins with the steady withdrawal of the state from this sphere, enabling the opportunism inherent within the entrepreneurial sector to intervene with the intention of turning health into a market for exploitation for profit. Critical to this shift in the provision of health from the state to the private sector is the transfer of responsibility for the 'management' of such provision onto individuals themselves – that is, to monitor and administer their own health within a sea of market driven consumer options. As argued by Waldby:

> *The management of the population's biological risk is no longer the exclusive responsibility of the nation state or national agencies. Risk management has demutualised and become a matter of individual prudential assessment, entrepreneurial self investment and selective forms of health consumption and private insurance made available through global markets* (Waldby, 2005: 5).

Thus the major shifts in the rationalities of biopower in the 21st century involve the "responsibilisation" (Waldby, 2005: 7) of individuals for the identification, management and administration of their behavioural and biological predisposition that inevitably delivers "sub sections of national populations to the transnational therapeutic and health insurance industries" (ibid.). Waldby describes this process as

the "marketisation" (ibid.: 8) of health, where self autonomous individuals become subject to the availability (and promise) of market derived solutions – not as citizens of the state but as consumers in a marketplace, thus further establishing "economic growth rather than social security as a primary source of legitimacy" (ibid.: 6). And this marketplace is one increasingly geared toward the provision of 'health' goods and services specific to ageing members of populations, who, as they progress into the latter stages of the life course, constitute the most significant (and growing) market opportunity in the domain of health. According to Neilson, "Nation States have experienced population ageing as a threat, so much so that they have willingly surrendered some aspects of their sovereign power to divest themselves of responsibility for the future consequences of demographic change" (2006: 155). This surrender extends beyond the domain of health provision for as part of this strategy to rid the state from the burden of ageing populations, almost every element of the relationship and obligation to them is subject to revision in the newly emergent biopolitics of risk. As mentioned in the subsection of the previous chapter "Refiguring the Third Age", moves are well underway to re-structure both pension schemes and retirement ages as a result of the potential risks associated with disproportionately large ageing populations. Gilbert's (2007) documentation of the experience in the UK reveals how the so called 'third age' is being reconsidered in the light of emerging challenges, given this disproportionate ageing of the population is a direct result of the Baby Boomer demographic anomaly. This involves the revision of pension provisions, an increasing emphasis on choice and market solutions and the push to extend working lives. In addition to these strategies, Neilson illustrates how in different parts of the developed world these processes are evident in:

> *the devolution of age-care services to the municipal level (Sweden), the partial transfer of responsibility for the maintenance of the elderly to communities and networks of 'social capital' (in British Third-Way politics), and the reform of pension systems to oblige investment on global financial markets (in almost every advanced capitalist country)* (Neilson, 2006: 155).

These strategies also include the heightening of the retirement age, tax incentives for older workers, and mandatory retirement saving schemes that invest future pension funds on the stock market.

Of critical significance for ageing populations charged with the task of managing their own individual risk are the effects of the Global Financial Crisis (2008). With many stocks slow to recover in an investment wary climate, and many possibly unable to, given the scale and depth of financial fallout, the consequences for the 'nest eggs' of ageing populations nearing retirement have been devastating. Blommestein identifies the financial assets of OECD pension funds as the largest stakeholders in the world financial system (2001), thus making them the biggest losers in this financial catastrophe. Ageing populations already identified by their relationship to 'risk' suddenly find themselves robbed of their future financial security by state mandated measures designed to provide for and protect post-retirement lives. In an era where risk is identified as one of the three key criteria by which an individual can understand their relationship to the biopolis (the social, political and environmental all subservient to the dominance of the economic), risk now becomes a compound equation that impinges upon individual 'autonomy' from several different directions. The self autonomous individual, charged with the task of managing his/her own risk

particular to health maintenance and provision, in addition to the responsibility to provide for their own financial future in later life (an ability now severely diminished by the 'free market' fluctuations of investments that were endorsed and encouraged by the state), is subsequently delivered to an alienated space of critical vulnerability (Phillipson, 2002). In this situation the individual, subject to varying degrees of state abandonment, can now be classified not as a citizen, but a consumer in market place.

I speak more about this development below in 'Ethopolitics and Ageing'. For now however it is vital to articulate a further dimension in which the biopolitics of risk develops strategies through which ageing individuals are governed, at a distance, through the promotion of discourses of 'successful ageing'.

Successful Ageing

In recent times governments around the world (Australia in particular) have adopted models of 'healthy ageing', 'ageing well', 'ageing productively', 'active ageing', 'positive ageing', or as I will focus on specifically here, "successful ageing" (Rowe and Kahn, 1988) that further prescribe ways in which self autonomous ageing individuals can, should, and 'will' manage and administer their lives to reduce the negative impacts of their ageing upon the state. According to Neilson, healthy or successful ageing is a "slogan" that:

> *governments worldwide have adopted to describe transformations wrought to systems of aged care and aged health provision amid the ruins of the social state ...* (with) *... an emphasis on the active effort of individuals to shape their experience of ageing in such a way that it reduces demands or dependency upon systems of public provision* (Neilson, 2006: 158).

Since as early as 1987 discourses of successful ageing began, with Rowe and Kahn arguing that "within the category of normal ageing, a distinction can be made between usual ageing, in which intrinsic factors heighten the effects of ageing alone, and successful ageing, in which extrinsic factors play a neutral or positive role" (1987: 143). According to Rowe and Kahn, these factors consist of three basic dimensions: first, the low risk of disease and disability; second, a condition of high physical and mental functioning, and third, an active engagement with life, including interpersonal relations and productive activity which produces a societal value, such as giving care, regardless of whether the labour is reimbursed or not (ibid.). The concept of successful ageing was advocated by the World Health Organisation in conjunction with the World Bank, the two making successful ageing a policy priority with the promotion of health and minimisation of dependency of older people a common principle of action (The World Bank, 1994; The World Health Organization, 1999).

The concept of successful ageing can be criticised on a number of levels. Similar to the Foucauldian inspired critique of bio-medical gerontology outlined in Chapter 2, successful ageing is a practice that normalises and essentialises the experience of ageing as a "problem" discourse (Powell and Wahidin, 2006), exposing the motivations of the vested interests (governments seeking to displace the financial burdens of ageing populations; predatory entrepreneurial opportunism preying on the profit opportunities produced by them) that has the welfare of aged and ageing individuals themselves, a distant second. Successful ageing represents another means

by which the aged become the subject of biopolitical interventions whose intention is to 'prescribe' behaviour via dictating what aged experience is and how it should be managed in order to delay and/or displace the inherent characteristic of risk that is the organisational basis of the ageing individual's biopolitical relationship with the world. Successful ageing highlights the key issue at stake in the biopolitics of ageing, and that is the way it operates as a means of colonising the future before it happens, in effect 'pre-empting' the future. In doing so, successful ageing becomes a biopolitical intervention that moves across temporal boundaries. As Neilson argues:

> *The temporal arrangement at stake in the practices that constitute this emerging health regime are oriented not toward the return of the buried past but toward the foreclosure of the future. Its temporal configuration is that of prevention or pre-emption, a strike against a future fate that can only be avoided, or so the fantasy would portend, by an action that can never occur too soon* (Neilson, 2006: 158).

Notions of successful ageing promoted by such organisations as the Word Bank and the World Health Organization encourage nation states to withdraw themselves from the risks associated with ageing populations, in the knowledge that the provision for these 'risks' will be adequately delivered (indeed over supplied) by the commercial entrepreneurial sector all too ready to step into the breach. In many ways this seamless transition is itself pre-meditated by market interests who are the driving force enabling such sweeping changes to these relationships. As Neilson points out:

> *Little wonder then that the policy shift to healthy ageing has seen the emergence of new consumer options for health maintenance, body modification and the enhancement of capacities. With the weakening of the contract between the ageing individual and the state … [a]nti-ageing medicine operates precisely in this opening, seeking to match and even displace the expertise of geriatric professionals with new forms of entrepreneurial practice that aggressively target ageing individuals and seek expanding global markets* (Neilson, 2006: 159).

A concurrent result of the development of strategies for successful ageing are the complementary industries that cater to the 'needs' of this emerging market. Thus an 'anti-ageing' industry is born of the need to develop 'anti-ageing' medicines and therapies for consumers who are motivated both personally and biopolitically to 'anti-age'. For the purposes of this argument, what is important to note is not only the ways in which entrepreneurial interests have stepped in to fill the breach created by the withdrawal of state responsibility for the provision of such services, but the way in which they have augmented this site of entrepreneurial intervention with promissory applications, procedures and cures, "nascent" (Rabinow and Rose, 2003: 29) potentials that shape the expectations that ageing 'consumers' have in regards to their future. Such an industry, driven as it is by the profit motive that seeks to maximise returns on the available market share, endeavours to not only *provide* goods and services for this market, but in doing so speculatively *prolongs* the longevity of ageing individuals, thereby preserving its market base. Keeping the target demographic alive for longer increases their dependencies on anti-ageing goods and services, thus perpetuating the potential for profitable returns. It is the logic inherent in this process that leads, inevitably, to the development, application and normalisation of technologies and discourses that touch upon both the imagined and

literal manifestation of the 'trans' and/or 'post' human, that being the transitory phase to the realisation of an entity that can no longer taxonomically be classified as 'human'.

Though appearing in many and varied forms across millennia, anti-ageing medicine today is legitimated via the institutionalisation of it in the American Academy of Anti-Aging Medicine (A4M). Formed in 1992 by twelve physicians who have dedicated themselves to "approach ageing as a treatable condition or disease" (Neilson, 2006: 159), A4M claims to promote a "new health care paradigm" (American Academy of Anti-Aging, 2008) via the "extension of preventative health care" (ibid.) that "offers technical solutions to some of the challenges nation states face with the ageing of the baby boom generation" (Neilson, 2006: 159). As stated in their charter:

> *A4M is a US federally registered 501(c) 3 non-profit organization comprised of 20,000-plus member physicians, health practitioners, scientists, governmental officials, and members of the general public, representing over 100 nations. The A4M is dedicated to the advancement of technology to detect, prevent, and treat aging related disease and to promote research into methods to retard and optimise the human aging process. The A4M is also dedicated to educating physicians, scientists, and members of the public on biomedical sciences, breaking technologies, and anti-aging issues. The A4M believes that the disabilities associated with normal aging are caused by physiological dysfunction which in many cases are ameliorable to medical treatment, such that the human lifespan can be increased, and the quality of one's life enhanced as one grows chronologically older. The A4M seeks to disseminate information concerning innovative science and research as well as treatment modalities designed to prolong the human lifespan. Anti-Aging Medicine is based on the scientific principles of responsible medical care consistent with those of other healthcare specialties. Although the A4M seeks to disseminate information on many types of medical treatments, it does not promote or endorse any specific treatment nor does it sell or endorse any commercial product* (American Academy of Anti-Aging, 2008).

The A4M is comprised of 20,000-plus members from 100 nations worldwide, 85% of who are physicians with 12% associated scientists, researchers, and health practitioners.

In *Anti-ageing Cultures, Biopolitics and Globalisation* (2006) Brett Neilson articulates the tension that exists between the discipline of bio-medical gerontology and that of the 'maverick' A4M. According to Neilson this tension exists primarily because the latter seek to promote an agenda the former deem impossible, being that certain critical thresholds in the ageing process can be overcome using a panoply of anti-ageing measures both available and promissory. Gerontologists schooled in the traditions of the bio-medical model of ageing disagree, although as the logic of economics dictates in a finite 'market' space, such quarrels over legitimacy are, as social gerontologist Robert Binstock argues, in part generated by competition for patients, funding, power and legitimacy (2004). This 'quarrel' is further evidence of the way economic concerns have subsumed that of the social, critical to which is the issue of whether or not such practices do anything at all, operating more as a profit orientated system preying upon the insecurities of the weak and vulnerable. In this regard anti-ageing medicine can be seen as functioning in the "nascent" space defined

by Rabinow and Rose (2003: 29), where promissory technical applications function as a form of soothsaying, a 'snake oil' that in the hyperbolic world of anti-ageing smoke and mirrors matter little for effectiveness or success so long as they provide results in the form of hope (the placebo), and correspondingly, profit. Anti-ageing medicine, now intrinsically part of the web of relations produced by the convergent forces of a disproportionately large ageing demographic, the withdrawal of state responsibility for that population and the compensatory (read predatory) nature of entrepreneurial interests that now occupy this space, becomes the principle shaper of the public imagination of hope, expectation and 'action' in ageing (formerly gerontology) discourse.

The opportunism surrounding anti-ageing culture is rife given the market rationalities that make it such a lucrative financial prospect. As Neilson suggests "With the financialisation of pension schemes in an attempt to avoid the so called age crisis there emerge new opportunities for those who promise to slow or forestall the ageing process" (Neilson, 2006: 160). The Methuselah Foundation "M" prize, where researchers who delay the ageing process in mice are rewarded considerably for their efforts (Methuselah Foundation, 2009) clearly represent such incentives. These opportunities are predicated by their potential to displace temporal inevitability, that is, provide the 'potential' to hold the future open and diminish where possible (and as yet not possible) the pre-determinations that bio-medical gerontology suggest are 'inherent' to the experience of ageing. Anti-ageing medicine is therefore no different to any other 'speculative' investment in the future. That such an industry operates in the zone of the 'not yet' enables it to fulfil a crucial psychological role not dissimilar to that performed by religion (Berger: 1967). The problem is, however, as Neilson points out, in such a climate of promise:

> *there has emerged a distinct gap between prevention and cure as both social causes and public actions disappear, leaving the citizen alone before perennial risks that he/she is obliged to manage within the constraints of a globalised market. If the logic of prevention or pre-emption fails, the individual is both responsible and guilty, left to fend within their own networks, however they might be experienced or constructed* (Neilson, 2006: 161).

The battle for empowerment in this complex convergence of forces is the key issue at stake in the arguments I am making here, in which a necessary focus will be on the ageing individual and what avenues are open to it to shape and define its own existence within the overarching constrictions of a 'prescribed' self autonomous 'freedom'. The purpose of this thesis is to explore ways of achieving or harnessing that potential, independent of the top down processes of hierarchical knowledge distribution, be it in the form of the sovereign leader, the state, or the private sector charged with the task of filling this void left by the withdrawal of all of the above. As Neilson states, we have to "account for lived dimensions of this uptake without reverting to … an elevated perspective – the viewpoint of policy that assumes it always knows better than subjects who face complexities on the ground" (2006: 161). Such contestations are, I argue, becoming ever more critical, for the anti-ageing environment illustrated here is buttressing up against an emergent 'molecular' potential that generates hope in consumers and pharmaceutical companies alike for future biotechnological developments (Hall: 2005). In this respect anti-ageing medicine is seen primarily as a "weak" (ibid.) form of anti-ageing, and can be

understood as the pre-cursor to more extreme or "strong" (ibid.) forms of anti-ageing or life extension practice. These biotechnological developments inform the much hyped argument that we might even be able to *prevent* ageing, just as other forms of disease and debilitation have been prevented (De Grey, 2005). Indeed, the argument I make here is that the emergent logic of risk aversion, as part of the anti-ageing biopolitical charter of neo-liberal countries, produces what I call 'immortalist biopolitics', whereby the operations of contemporary biopolitics, consciously or otherwise, seeks to avert significant financial risk by postponing the expiration of its largest and most important demographic cohort, keeping them alive, active, and capable of providing ongoing contributions, whether that be in the form of the labour they provide, both reimbursed and/or volunteer, and as 'economic stimulus' to the emerging anti-ageing industry. An analysis of the biopolitics of molecularisation in the context of contemporary ageing will substantiate this claim.

Molecularisation and Ageing

> *The dominance of the bio-medical model has populated negative conceptualisations pertaining to ageing. It has also sought to re-invent itself as the 'saviour' of ageing via the bio-technological advancements that foster reconstruction of the 'body' and to prevent the ageing process (Wahidin and Powell, 2001/Powell and Biggs, 2004). Indeed, the anti-ageing industry has boomed in recent years regarding such reconstruction but premised on consumerism. Science itself has suggested that secrets to eternal youth can be found in 'genetic codes' and that using stem cell research could curtail the ageing process* (Powell, Biggs and Wahidin, 2006: 12).

As mentioned previously, the terrain of biopolitics has since the 19th century been extensively geared toward the optimisation and maximisation of life, and in the latter half of the 20th century this pursuit has been orchestrated specifically through the medicalisation of health. As Rabinow and Rose identify, the developments in reproductive science and fertility in the 1970s (2003: 21) followed by the era of genomics in the 1990s (ibid.: 27) transformed established conceptions of what the body is, how it can be read (as code) and what this means in terms of its 'natural' state. Increasingly, the malleable potential contained within that 'raw' (that is 'refinable') material is the subject of much speculation and revision, with the discovery in the last decade of the potential of human Embryonic Stem Cell (ESC) lines further inspiring this possibility that the medicalisation of life is capable of re-engineering and re-defining human existence in unprecedented ways.

ESC lines are understood to be 'pluripotent' in that they are neutral or 'undifferentiated' cells that hold the potential to quite literally adapt into any of the bodies complex tissue types. ESC lines can be reproduced in large numbers and can be applied in a variety of somatic contexts, from the regeneration of organs, muscles, bones and joints to cartilage and skin. It is widely believed that they have the capacity to regenerate damaged tissue from almost any injury or ailment from Alzheimer's and Parkinson's disease, stroke, spinal cord injuries, complex joint damage and arthritis to name but a few. Early clinical trials suggest any and all of these possibilities are more than probable given their resounding successes at the experimental phase. As such they are considered a gigantic leap forward in the ability to re-create and/or re-generate life, holding profound implications for ageing individuals, the most 'at risk'

and disproportionately large demographic to benefit (and/or be exploited) by such developments.

Critical to this discussion are the social impacts of these developments that promise (and/or threaten) to reconfigure both the epistemological and subsequently, ontological basis of not only ageing populations but humanity in general. Originally understood through the hyperbole surrounding the advent of 'genomics' in the 1990s, it was thought that the greatest potential for these newly emergent molecular applications would be made manifest in the form of 'eugenics', the engineering of life at its beginning. Imagined as a vast screening of genetic abnormalities and vulnerabilities in the genes of parental populations, it was proposed that the less desirable traits of our genetic inheritance could be modified or eliminated for the benefit of 'optimising' and 'maximising' the potential of future generations. Questions as to the 'standard' or 'norm' to which genetics should aspire became embroiled in debates as to where 'therapy' ends and 'enhancement' begins (Fukuyama, 2002). These insurmountable ethical difficulties are further compounded by the historical problem of eugenics, previously only ever employed (in humans) by Nazi Germany. The most significant objection to be raised in this context is the genetic manipulation of the yet to be born, raising sensitivities regarding the question concerning the right to intervene at the very 'start' (that is, conception) of a life. In this capacity ESC research has encountered similar difficulties in that it takes the beginnings of life (unfertilised embryos) and appropriates that material to be 'immortalised' in the form of pluripotent stem cell lines for the purpose of application to existing 'adult' disease and/or injury. This additional factor created an enormous backlash from the right to life movement, which caused a ban on development of further ESC lines in the US in 2001 by the Bush administration.

There are severe ethical dilemmas in harvesting these potentials from the 'beginnings' (embryos) of life, as there are in applying genomic screening technologies to the beginnings (that is conception) of life. In terms of application the situation is quite different for those comparatively nearing the 'ends' of life (ageing populations), where the ethical constraints to modification are considerably less. This potential is made even more salient in light of the fact that ESC therapy stands to 'optimise' and 'maximise' the life of ageing populations, as it is mandated by the biopolitical policy objective of 'successful ageing'. Therefore, it is in ageing populations that newly emergent biotechnology finds its natural social and economically lucrative complement to both drive and normalise its development, and lead to its wide scale application. In this capacity, some pundits declare that the molecular technology market has shifted in recent years from the then original focus on "designing babies to designing Baby Boomers" (Kurzweil, 2006).

As stated previously, the development of science is, strictly speaking, contingent upon the existence of a market that will make that scientific endeavour profitable. Scientific inquiry is more often than not initiated by the need to produce science for a market. In this capacity, science (like most other dimensions of life) is subservient to the paradigm of economic rationalism. Science is not simply discovered, it is produced, and this production is done in accordance with the demands of the economic context at hand. As Thomas Kuhn's seminal social science analysis of the natural sciences *The Structure of Scientific Revolutions* (1962) suggests, it is the capitalist economic imperative that both funds and orientates the production of science and technology,

with scientific inquiry as an altruistic, pure thing in itself, today an anachronistic, ancillary concern. As Ian Hamilton-Grant argues:

> *In the late twentieth century ... science occupies a crucial post in the formation of the postmodern condition. This is less because of the content of scientific ideas than it is due to the increasingly powerful economic situation it enjoys under a capitalism that has become wed to technological advance ... Science must perform ... Knowledge in itself is not a saleable commodity (therefore) scientific knowledge must be translated into economic success, making techno-science commensurate with capitalism and aiding, thereby, the reduction of all language games to the single rule of profit* (Hamilton-Grant, 1988: 59).

The same logic of scientific/capitalistic production applies to ESC technology. To reiterate Rose from the previous chapter: "Hence the politics of the life sciences – the politics of life itself – has been shaped by those who controlled the human, technical and financial resources necessary to fund such endeavours" (Rose, 2001: 15). As an at 'risk' population, ageing individuals stand the most to gain from such applications, and incidentally, constitute the most likely (lucrative) market for this emergent technology to develop into given their size, economic leverage, consumptive capacity and comparatively minimal ethical constraint. This natural complementarity serves to further entrench the prescribed freedom such populations are subject to under the guise of 'self autonomy'. The question this thesis seeks to ask in this context is: if such a biopolitical mandate is 'prescribed', what recourse to individual action and empowerment do aged and ageing individuals have within these overarching biopolitical discourses?

Of significance to this analysis is the way ESC therapies are yet to have any real impact on ageing and aged experience due to their underdevelopment as a mass therapeutic tool, largely the result of the slow process of testing and authorisation by governmental bodies. By Australian standards, reports vary in the popular media as to the projected availability of such therapies – from a few years to a few decades away, though the growing markets for international stem cell tourism in countries with less rigid controls over testing and regulation are already ubiquitous (Waldby, 2005: 5; Hall, 2005). Despite this apparent lack, the promissory claims of ESC therapies have taken hold in the popular imagination, largely the result of the optimism generated by the current climate of 'anti-ageing' hyperbole. Such a culture of ebullient expectation implants itself into the psyche of potential consumers and in turn generates a kind of self-fulfilling prophecy. As identified by Neilson:

> *Although largely unrealised in clinical applications, the promise of stem cell research to uncover a kind of latent 'surplus' life in even the most aged bodies has fed the dream of prolongevity. Anti-ageing websites display news about biotechnological developments, reporting not only on stem cell science but also on other areas of research such as tissue engineering, cloning, and telomere maintenance ... In this way, the biotechnological imaginary extends across and adds legitimacy to the diverse and contradictory forms of anti-ageing practice* (Neilson, 2006: 152).

As Rabinow and Rose suggested earlier, such developments in anti-ageing practice, be they biotechnological or softer versions thereof, are "nascent" (2003: 29) in that

they circulate ephemerally in the suspended constellations that comprise the 21st century biopolitics of ageing. As part of the biotechnological imaginary, they fuel optimism of the *not too distant future*, of the possibility for extended life and indeed the unlimited dream of perpetual progress beyond that. According to the laws of economic growth, the objective of 'unlimited' progress is the dominant ideology around which all activities are organised. The question for ageing populations subject to such discourses is: 'where do such speculative endeavours (given the unlimited potential of stem cells and beyond) end'? If the logic of the biopolitics of risk is to displace the costly and burdensome 'problem' of ageing populations, and anti-ageing markets cater to this mandate through the nourishment and rejuvenation of ageing bodies, would it not appear that the horizon of life expectancy itself is a figurative construct, if not a remediable medical condition altogether?

As stated in the introduction, the purpose of this thesis is not to speculate so much on the salience of these "nascent' developments, nor their possible trajectories *per se*, so much as it is an inquiry that focuses on *how* such processes are taking place and what this means for ageing consumers making decisions and forming expectations based on these "nascent" discourses in the here and now. For the purposes of this thesis it is enough to register that such proclamations are on the horizon of probability, and that such 'wishful' thinking is embedded in the contemporary discourse of risk management (and action) that drives and fuels these trajectories.

One critical perspective through which to view these developments comes from studies on the sociology of ageing. Dumas and Turner allude to what such life extension technologies mean for post-modern societies:

> *To borrow the formula of Anthony Giddens* (2000), *the life-extension project is anchored in a future orientated system and provides much comfort to the anxiety caused by death in modernity, where traditional religious paradigms have lost their authoritative certainty* (Dumas and Turner: 2007: 8).

However, to delve into this compensatory 'comfort' system, these authors argue that beyond expectation comes the concomitant question of what constitutes a 'norm', indeed, what is then, a legitimate life, if the traditional ways of knowing and experiencing it are subject to radical and violent reconfiguration:

> *With recent developments in biomedical sciences, the unprecedented increase of the human-life span becomes real, but only in the abstract. If the idea of significantly extending the human life span is embraced by scientists, then ageing becomes pathological, because the fundamental conditions of existence of the human species no longer holds* (Dumas and Turner, 2007: 10).

This brings the focus back onto the argument that ageing is not a natural inevitable but a potentially remediable medical condition, a *disease to be cured*. It is here that the ageing consumer is faced with a critical impasse, for the Promethean technologies of the new molecular age extend not only the 'expectation' of an extended duration of life, but the very capacity for human hubris to believe in its own immortality. As proclaimed by Cambridge gerontology theoretician and leading voice in the pro-longevity movement, Aubrey De Grey, "Ageing has been with us for a long time, despite our best efforts. The idea that it will be with us forever has ceased to be tenable, however, and the race is on to expedite its elimination" (De Grey, 2004: 2).

Thus the already burgeoning anti-ageing industry finds itself muscling up against the improbable question of delaying if not avoiding death altogether. In a climate of hyper optimistic (and opportunistic) proclamation, one has to consider the position of the ageing individual who is not only the subject and intended destination of these discourses, but one self-autonomously charged with the task of managing their health and well-being within them. Thus the molecularisation of biopolitics entails not only an outright reconfiguration of what the species could be, it locates that possibility in the expectations of anti-ageing consumers in the present day who are increasingly mandated to engineer their own 'autonomous' horizons on such speculative grounds.

These apparent manifestations in the 21st century biopolitical scene are not only the subject of the biotechnological endeavours to produce them, they are increasingly the subject of biopolitical research that is attempting to 'gauge' consumer attitudes and expectations of them, as if these attitudes and expectations are the contingent force upon which their very possibility exists. To localise the context of what are otherwise global developments, the Australian Research Council (ARC) has in recent years commissioned two research projects to analyse in particular what these expectations are. As part of its Discovery Grant Program, in 2005 the ARC commissioned the University of Queensland School of Population Health to conduct a research project titled *Knowledge and attitudes about life extension technology: public and stakeholder perspectives* (Hall, 2005). The study has direct relevance to the National Research Priority number 2: "Promoting and Maintaining Good Health", specific to the priority goal of "ageing well ... ageing productively". As stated in its introduction:

> *The aim of this study is to assess public and professional understandings of, and attitudes towards, potential technologies that will substantially extend human life expectancy, either through direct intervention in ageing processes or indirectly through cumulative advances in preventive health and the treatment of the common diseases of middle and older life. This information is essential to inform policy towards emerging life extension technologies that could have a significant impact on an already-ageing population* (Hall, 2005).

The study aims to provide answers to key questions such as: how members of the public understand the possibilities for increasing life expectancy, the likelihood of the general public to take up these life extending interventions, what mitigating factors determine these interventions, how key stakeholders such as researchers, clinicians, and policy makers view the possibility of life extension interventions, to what extent their views are concordant or discordant and what the research and policy priorities of the future are for Australia in terms of life extension. The study analyses both "weak" (anti ageing medicine) and "strong" (biotechnological applications) forms of life extension, and makes the argument that such potentialities are not only possible but "apparent" and likely to be readily available, both locally and internationally, given certain time frames.

The second study commissioned by the ARC complements the first in that it details the effects of anti-ageing entrepreneurial propaganda on consumers at the coal face of such developments. *Anti-Ageing Devices: On the Cultural Politics of Staying Young in a Globalised World* (Neilson: 2005) is conducted by the University of Western Sydney's Centre for Cultural Research. Similar to the UQ study, it states on its website:

> *This project explores the proximity of the promotional materials of anti-ageing entrepreneurs to the 'healthy ageing' policies central to Australia's strategies for the governance of later life. Little is known about how these initiatives are received at the users' end. By approaching 'healthy ageing' campaigns as part of a continuum of images and forces that reconfigure the popular understanding of the life course, the project seeks to inform the long-term policy debate regarding the healthcare of Australia's ageing population. Addressing ARC priority goals 'Ageing well, ageing productively' and 'Preventative health,' the study will be of interest and use to policy makers, industry, advocacy groups, consumers, and the wider community* (Neilson: 2005).

Both these studies, commissioned as part of the Australian Research Council's national strategy toward the biopolitical management of ageing populations, acknowledge the "nascent" terrain in which Embryonic Stem Cell therapy and other biotechnological applications exist. The purpose of these studies is to inform policy makers on the plausible causes of action in the country's national interest, and in an unusual sense, they do this using 'assumptions' based on 'probable' scenarios that pre-empt their actual manifestation in the phenomenal world. In themselves they form in essence a self fulfilling prophecy, another example of Haraway's "fact as the past tense of fiction" (Hamilton-Grant, 1998: 69) theme that is recurrent throughout the arguments of this thesis, reinforcing the hyperbolic expectations of an anti-ageing imaginary yet to exist.

As the 21st century biopolitical climate dictates, public perspectives 'are' stakeholder perspectives. For the purposes of this argument, what these research projects indicate is the genuine motivation of a state funded research body that has its mandate clearly spelt out for it by the World Bank and World Health Organisation. To conflate the agendas of both the ARC commissioned studies, this thesis argues that their motivations should be seen as evidence of the way the Australian Government as a nation state is working toward enabling a seamless transition from state provision of health care to a private market orientated supplementation, especially geared toward displacing the burden of ageing populations through the innovation of policies and measures that will do away with the perceived 'problem' of ageing populations altogether; that is, to diminish the health care burden of looking after them, and to concomitantly yield a longer working life from them.

As part of the Australian Government's position on these matters, policy makers from all areas of government have been grappling with an appropriate response to the problem of an ageing population. A report from the *Prime Minister's Science, Engineering and Innovation Council* presents a vision for up to an additional 10 years of healthy and productive life expectancy by 2050 (Prime Minister's Science, Engineering and Innovation Council, 2003: 27). This motivation is noted by Catherine Waldby, who connects the problem of ageing populations in relation to diminishing work forces as a global phenomenon, something stem cell science has the capacity to displace:

> *In the case of aging populations, the demographic changes associated with longer life span, increasing levels of chronic disease and decreased fertility rates currently confront most of the OECD nations with a series of extremely difficult issues regarding the reproduction of the working population ...*

> *Embryonic stem cell technology and other forms of regenerative medicine offer the possibility that the ageing body of the citizen may yet be able to extend working, tax-paying life. Stem cell technology presents a case study of the ways that commercial in virtro vitality has become a site for population biopolitics, relocating the agency of biopolitical processes away from population, intercorporeal and anatomical level to the cellular and molecular level ... It potentially displaces social security based biopolitics (pensions, nursing homes) with the promise of biological security and continued economic productivity* (Waldby, 2005: 11).

Waldby raises several issues here worthy of consideration. Molecular biopolitics follows the same logic of optimising and maximising life, however, as opposed to viewing life as populations or, on the micro scale, individual bodies, molecular biopolitics is an attempt to govern the molecular constitution of these bodies as entities in themselves, with 'living tissue' now the primary focus and site of desired outcome of biopolitical interventions. Such a regeneration of ageing and therefore less productive tissue requires the redistribution of it from the beginning to the end of life, from the 'embryo to the entropic'. This view reinforces the notion that the citizen of the state is no longer granted the privileges it once was, involving a process of increasing objectification of individuals not merely as objects but as objective 'processes' operating on the molecular scale. Reduced to an economic equation within a "system of objects" (Baudrillard, 1988) or objective processes, the ageing individuals very *raison d'être* is reduced to a subscription to discourses of productivity, growth and progress through the consumption of anti-ageing (and by proxy biotechnological) goods and services. Though nearly three decades on from its original hypothesis, the insight from French philosopher Jean Baudrillard (1988) still applies here, albeit on an increasingly micro managed scale, where the system of objects in consumer society (individuals) has become the process of cellular efficiency in the 'life force' of a living economic system, with the vitality of life redistributed from the beginnings to the ends of life in order to optimise and maximise its operational capacity given the contextual demands of the here and now.

So far in this analysis such issues of biopolitical management have focussed on the level of state intervention, albeit at a deregulated, delegated distance. Yet complicit with this state mandated operation is the symbiotic enterprise of commercial entrepreneurialism that underwrites the future of the aged and ageing person as a market equation, shifting their position from that of citizen to that of consumer, or perhaps more accurately, 'object' to be consumed. This process is apparent not merely as a recent phenomenon, but one which has its roots stemming back to economic circumstances decades previous. As revealed by Waldby, in the 1970s corporations that suffered from outdated modes of mass production sought to "re-tool" to models of "post-fordist 'flexible accumulation'", and thus turned to emerging techno-science practices as potential opportunities to profit and prosperity (Waldby, 2005: 6). In the aftermath of the dot com crash in 1998, Waldby argues that "the commercialisation of biology is widely regarded as the best hope for a new wave of science-based profitability" (Waldby, 2005: 6). Since this time we have witnessed the frenzy to find the human genome, among other forms of "bio-prospecting" (Arico and Salpin, 2005). However, what is arguably the most lucrative form of potential bio investment lies in the capacity of molecular biology to re-engineer life, and in turn provide handsome rewards for those capable of locating, patenting and in turn applying biology's 'holy grail'. Such endeavours are of course complicit with the state driven

agendas that enable such possibilities, that in fact promote them vociferously, and thus establish the grounds upon which such entrepreneurial endeavours may be made manifest. As Waldby indicates:

> *It is also evident that the competition state supports the biotechnological desire to optimise organism vitality through the identification of points of micro-biological leverage – single nucleotide polymorphisms, proteomics, and telomeres' – that may one day provide new kinds of mastery of in vivo processes at the level of the individual patient. The hope is that such micro-level interventions will provide both new forms of economic prosperity and downstream therapeutic applications that can be used both within national public health services and marketed transnationally to other national and private purchasers* (Waldby, 2005: 7).

In this respect the biology of human beings (or more to the point, the molecules that constitute entities that generate an entity loosely resembling what used to be referred to taxonomically as a 'human being') are the target of these state inspired biopolitical interventions, for it is the future upon which wealth generation is seen to be most lucrative. And the good news for business is that in a world of finite resource where traditional forms of wealth generation are on the wane, the biology of human beings, coupled with the need to displace the unwanted ramifications of ageing populations produces for the commercial sector a market potential that is quite literally, infinite! As stated by Dumas and Turner, "Specifically, in the new biotechnological environment, disease is no longer a negative force in the economy but on the contrary an aspect of the factors of production. This economy can capitalise on disease by keeping people alive longer" (2007: 7). If we in turn then adopt the perception that ageing is a disease, merely because we have procedures and applications that contest its inevitability, it is not such a stretch of the imagination to then frame death itself in a similar, remediable light. The race is on, as Aubrey De Grey previously mentioned, for the holy grail of immortality (2005), and not so much for the extraordinary leap it will create in evolutionary terms but more so because it constitutes the most salient source of revenue to drive, grow, and maintain the hegemonic structure of transnational corporations. Indeed, it is the 'corporate bodies' who are the most privileged bodies in these emerging cartographies of biopower, evidenced by the way their character and logic are becoming increasingly intertwined with the biological bodies hierarchically subservient to them. It is no coincidence that for the corporate body to maintain a healthy, productive longevity it must instil the same 'virtues', the characteristic 'optimisation' and 'maximisation' in the bodies of the very individuals upon which the abstract notion of the corporate body is itself predicated.

To reiterate Rose's initial thesis that "the laboratory and the factory are already intrinsically interlinked" (2001: 15), it becomes clear then that for ageing individuals the future is underwritten by market forces that dictate questions of what, how and for whom these emergent biotechnological applications apply. The question this thesis asks, therefore, is: what agency or genuine freedom do self-autonomous ageing individuals have within these schemes? Such questions seek to address the implications of the postponement of mortality indefinitely, which the 21st century biopolitical context appears to be cultivating. As Rose's initial thesis argues, "the politics of the life sciences – the politics of life itself – has been shaped by those who controlled the human, technical and financial resources necessary to fund such endeavours" (2001: 15). The question that remains is how ageing individuals are

likely to respond to such developments, mandates and inevitabilities? The task now is to analyse current practices and trends within this demographic to gauge how the precursors to such nascent procedures and applications are faring and what their likely trajectories will be, in turn exploring what avenues to empowerment and resistance exist in and around these dominant biopolitical discourses.

'Fantaceuticals'

In *Generation Ageless: How Baby Boomers Are Changing the Way We Live Today ... And They're Just Getting Started*, Smith and Clurman (2007) have conducted research into the emerging trends in ageing markets, in particular the way impressions are formed in consumers from which assumptions can be drawn as to their probable future behaviour. They state that in the US alone anti-ageing medicine has already reached sales of $50 billion per year, with predictions that it will be around $71 billion by 2009 (Wilson, 2007). As they argue, the general mood within the Boomer mindset is one of extreme optimism that extends a welcoming embrace toward anything and everything that enhances their capacity for the experience and longevity of life. Using attitudes toward sexuality in ageing populations as an example of this ethos, Smith and Clurman believe:

> *Boomers take comfort in their Viagra fuelled rescue fantasies of pharmaceutical breakthroughs ... Besides Viagra, boomers have witnessed the introduction of a plethora of so called lifestyle drugs that promise to cure their ills as well as sooth their vanity* (Smith and Clurman, 2007: 93).

The list of pharmaceutical applications relevant to this Boomer 'cure all' ethos include drugs such as Cialis, Levitra, Caverject, Rogain, Propecia, Xenical, Meridia, Seroxat, Prozac, Zoloft, Aricpet, Botox and Renova, not to mention the recent popularity in the use of Hormone Replacement Therapy as a means toward maintaining youthful vigour. Directly or indirectly, all of these products are consumed either wholly or significantly by ageing, health and beauty conscious Boomers. Whether it is erectile dysfunction, hair loss, obesity, depression, anxiety disorders, high cholesterol, Alzheimer's disease or skin ageing, all these ailments and conditions are now addressed by an-ever growing panoply of pharmaceutical rescue remedies. Furthermore, surgical procedures that both enable and enhance the lives of ageing populations are poised to experience exponential growth. The American Academy of Orthopaedic Surgeons projects that in the US alone there will be a 673 percent increase in knee replacements by 2030 (2006). The American Society for Aesthetic Plastic Surgery documented in 1997 that surgical and nonsurgical procedures numbered little more than 2 million, with that figure growing to 11.5 million per year in 2005 (ibid.: 94). The same society reports cosmetic procedures have grown 119 percent over this period, with all procedures up 444 percent (ibid.: 96). Clearly, medical advances are enabling ageing people to be in greater control of their physical bodies, and as Smith and Clurman argue, such developments are "empowering them to make conscious, deliberate decisions about the kinds of bodies they would like to inhabit" (ibid.: 154).

I argue that these developments are precursors to further forms of life enablement and, critically, *life enhancement*, with significant life extension the penultimate goal (one short of immortality). With an ever emerging potential for both weak and strong

forms of life extension accelerating in cadence with scientific advance, the expectations of ageing populations in turn embody these discourses and charter future trajectories based on the inevitable development of more to come. What we see in this context is not only bio-medicine dictating what it is Boomers will want to apply to themselves, but Boomers themselves generating the need for new products, applications, techniques and service delivery. This recursive feedback loop between prescription, need and desire is not so much a question of one dictating to the other but a shining example of mutual symbiosis evolving complementarily. Ironically, just as this cohort were defined by a pharmacological intervention (The baby boom ended with the introduction of the birth control pill in 1960 and its widespread use by 1964), so too will their 'demise' be governed by an emerging pharmacology that could extend the lives of this cohort indefinitely.

To conclude this section on molecularisation it is important to re-situate these developments specific to the context of ageing individuals and their capacity for agency and navigation in an accelerating climate of speculation and expectation. As Canton, a futurist and advisor to many *Fortune 500* companies suggests:

> *Just as the seventy six million baby boomers* [in the US]*, those born between 1946 and 1964, have redefined every aspect of culture, from media to technology to sports, so too will the boomers redefine health care, making it about life extension and human enhancement so they can extend their power, influence, and themselves into the future by living longer and healthier. This is a critical motivation for the most affluent demographic on the planet ... If you consider the life extension trend in context with the need for society to keep the highly skilled boomers employed in the future workforce longer ... Longevity medicine will lead not just to longer lives, but to longer, more productive workers. In a future at risk of depopulation due to lower birth rates, longevity medicine, I forecast, will become a much needed social entitlement* (Canton, 2007: 125).

The "Social Entitlement" that Canton speaks of here now turns the argument away from biotechnological life enablement and extension as a multinational corporate driven prescription for living, to biotechnological life enablement and extension as a human right, one that repositions the ageing consumer not as the subject of these discourses but the generator of them. This argument leads to the third and final dimension of Rose's biopolitical schema in relation to ageing, that being 'ethopolitics', the rights of a consumer group.

Ethopolitics and Ageing

The emergent biopolitics of the 21st century, though largely governed and directed by the twin axis of risk management and molecularisaton, ironically entails a measure of flexibility and individual empowerment and possibility in the domain of ethics, or what Rose identifies as "ethopolitics" (2001: 2). To reiterate, ethopolitics can be defined as the self governing techniques by which individuals can observe, analyse and identify themselves, thus enabling a perspective through which to "act upon themselves to make themselves better than they are" (Rose, 2001: 18). Rose argues that ethopolitical concerns embody "vitalist" (ibid.: 18) discourses that allow the rights of individuals to contest and ultimately choose, as a discipline of self-governing autonomy, the right path or passage to health that they consider optimal and that will

maximise the terms of their existence. Vitalist here refers to a way of knowing that counters scientific omniscience, that is, that remains agnostic in its perception of what reality is and could be, independent of knowing in wholly rational, deductive, scientific terms. As previously mentioned in Chapter 3, the irony apparent is that despite the growth of positivism as a result of the life sciences' increasing ability to determine human epistemology and correspondingly ontology, there is this equal and opposite "vitalist" resurgence that exerts a measure of individual and collective empowerment within this equation that, according to Rose, has the potential to override positivist determinations. To reiterate:

> *On the one hand, our very personhood is increasingly being defined by others, and by ourselves, in terms of our contemporary understandings of the possibilities and limits of our corporeality. On the other hand, our somatic individuality has become opened up to choice, prudence and responsibility, to experimentation, to contestation – and so to a 'vital politics'* (Rose, 2001: 20).

Critical to understanding the biopolitics of ageing in the 21st century is the notion that within these overarching discourses of risk and molecularisation that encroach upon the domain of individual autonomy, or that prescribe for individual autonomy precisely what that autonomy is, exists the collective power of ageing populations as a demographic force to contest, demand and ultimately shape the form and substance of what it is "positivism" offers, how it is delivered and what it will produce once applied. As previously established, ageing consumers (not citizens) are biopolitically mandated to maintain active and ongoing contributions given the impact their ageing and retirement has on the biopolitic as a whole. Yet as stated in Chapter 2, this mandate is something ageing individuals, Boomers in particular, wholeheartedly desire as part of their drive to maintain the youthful vitality and prosperity that so defines their generation. In this context their identity as individuals is inextricably linked to their 'marketability' as an object within a system of market relations. Their success within this system is thus largely determined by their ability to stay abreast of the latest enablements, enhancements and augmentations as they become available. The future potential to extend healthy and productive life thus becomes one of (if not the) key critical areas that will shape and define the cultural landscape in the years to come, as argued by Canton:

> *The ability to extend healthy life will have earthshaking societal, political, environmental, and individual consequences ... Longevity medicine is not just about the future of health care; it is about a personal and social transformation in a culture that will define how individuals will live, work and interact. Laws may be passed to grant enhancement rights to citizens ... I forecast the era of longer living, beyond one hundred years of age, will become common within ten years and be considered a birthright by 2025, due to longevity medicine. The individual's right to be enhanced – genetically, physically, cognitively – will become a complicated social issue in democratic societies. Success may be determined by enhancement features like beauty, intelligence, or skill* (Canton, 2007: 117-8, 121).

So not only is the issue the result of a biopolitical need and a concomitant multinational corporate deliverance, but also a case of individual right. In this sense, *ethopolitically*, the quest for healthy and productive life extension becomes more a question of human right than it is one of collective biopolitical good. Ultimately the

arbitration of these arguments will be built on the context of human rights as the *right to life extension*. In accordance with the doctrine of freedom as it is expressed in the American Declaration of Independence that guarantees the right to life, liberty and the pursuit of happiness, the right to extend one's life (given the genuine ability to do so) is poised to become one of the most poignant and potent expressions of this. As argued by Dumas and Turner:

> *The right to optimise longevity must be understood through the politics of human rights. Drawing on the post-human perspective, it is plausible to assume that the right to a healthy life beyond the natural life span can one day be supported by governing institutions. For instance, Article 3 of the Universal Declaration of Human Rights (everyone has the right to life, liberty and security of a person) can be used to this end* (Dumas and Turner, 2007: 12).

Similarly, as these "nascent" technologies develop, the makers of them will be held accountable if they are not engineered in accordance with the demands of the consumers who will use them. As Waldby argues:

> *While health consumers purchase private health insurance and for-profit therapies and services, they also demand greater accountability and transparency from big pharmaceutical companies for example, as part of their consumer rights. Consumer rights have been extended dramatically by patient advocacy and medical charity groups, who are increasingly likely to form trans-national research alliances with biotechnology and pharmaceutical companies, exercising control over the direction and funding of research that will directly impact on the treatments produced for their conditions ... As health care provision and medical conditions themselves become more globalised, the idea of health as a civil right has been increasingly displaced by the idea of health as a human right* (Waldby, 2005: 5).

A key element, as yet unmentioned, is the ability of specific nation states to develop and administer such possibilities. It is anticipated that ESC therapies, though clearly successful in application, could still take years to become available in countries like Australia that have rigorous testing and approval processes. Because of this an emerging black market in ESC therapies has developed with consumer options now extending beyond national boundaries:

> *We now see the emergence of global markets, where buyers and sellers ... circumvent national boundaries. With the expansion of communications technology, notably the internet, major barriers to transferring health-related goods and services between countries are decreasing* (Kumaranayake and Lake, 2002: 78-96).

Critically, these 'health related' goods and services are specific to Boomer orientated needs and wants, given their overwhelming purchasing power as a demographic and their desperation to access treatments, therapies and applications that will extend and augment their inevitably ailing lives:

> *Health consumers around the globe provide markets for 'luxury' medicine, like cosmetic surgery and anti-ageing therapies* (Schepeur-Hughes, 2002);

> *The market for these kinds of treatments is set to expand as the populations of the developed nations grows steadily older and live longer with more chronic disease* (Waldby, 2007: 5).

It is through such markets that ageing individuals are exercising their will and importantly, their rights, irrespective of local legislation and geography. In some ways this is just another instance of the way deregulation and globalisation, the principle tenets of neo-liberalism, are undermining the sovereignty of the very political systems that bought them into being in the first instance. For Boomers this is a convenient addition to an already established penchant for cosmopolitanism, orientalism and unbridled hedonism. As Dumas and Turner explain:

> *Companies operating in the Caribbean and south-east Asia are already offering regenerative medicine as part of holiday packages, designed to alleviate the negative consequences of degenerative diseases such as multiple sclerosis or diabetes. Regenerative medicine could be combined with sex tourism as an attractive package for geriatric holiday makers* (Dumas and Turner, 2007: 7).

In this sense ethopolitics is about the ethics of individual rights specific to the demographic and socio economic position of that demographic, more so than it is about individual relations to the remainder of the world's population, that are in this instance clearly geared toward the service of the dominant Western hegemonic paradigm. Ethopolitics in this sense should not be confused with ethics *per se*, as the spirit or even the residue of benevolence and altruism becomes lost in translation between the rights of the common good and those of wealthy Western individuals. As ageing populations armed with insatiable egos, purchasing power and *human rights* all clamour for the latest and greatest, whatever and wherever it is, it should not be underestimated the degrees to which self interest will go to preserve the sovereignty of that 'self' at all costs.

Longevity Ethics: A Moot Point?

The rights to life extension will also in large be based on the argument of longevity enthusiasts that suggests the potential to further extend one's life increases the longer one can possibly live (Kurzweil, 2006). This is because the development of technology specific to the goal of increasing longevity is and will continue to evolve to achieve both the original aims of the technology and reveal/create others over time. The longer one lives means the greater chance one will have to delay the onset of senescent decline because the greater access one has to the ever emerging panoply of life augmenting/saving techniques continually being developed. The longer one can live, the longer the window of opportunity is left open to access emerging life sustaining technologies, perhaps even the holy grail of life extension that will (given our collective propensity for manifesting desire, especially when that desire has a lucrative profit motive) 'inevitably' arrive. As the previous chapter explained, such technologies are produced (and in this case sustained) by the markets (ageing populations) that create them, thus it makes salient business sense for entrepreneurial interests to 'maintain' that market base *at all costs*. Thus, this contemporary techno-cultural logic poses the scenario whereby ageing populations could perpetuate their ailing bodies indefinitely! As Duke University researchers find, there is no natural upper limit capping our life expectancy (2002). Given such malleable expectations,

and the lack of any sense of 'limit' within the demographic for which they are produced, this coupling can only serve to manifest in ways never before experienced, either epistemologically or ontologically. In this sense the delay of the ageing process has ongoing effects, indeed produces technological apparatuses whose effects are 'compound', that is, "designed things go on designing" (Fry, 2009a: 3), where technologies that delay or arrest the ageing process will continue to develop, keeping people alive longer, and so on. I will now consider the wider ethics associated with these issues, departing from the ethopolitics of any particular demographic group (such as ageing Boomers) to concentrate on the greater good of the biopolitical population as a whole.

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The question of delaying the ageing process generates a rigorous debate that is vehement in the passion espoused on both sides of the argument. 'Pro-lifers' in this sense come up against an opposition whose passion is not dissimilar to that witnessed in more visible 'right to life' campaigns such as the anti-abortion movement, that is telling of the severity and polarisation of issues that surround the right to both life and death at both ends of the human age scale. The critical issue to stem from this debate is the question of whether or not an increased quantity of life necessarily translates to a proportionate increase in the quality of life. As Neilson suggests:

> *It remains an open question as to whether attempts to decelerate or arrest the ageing process will facilitate a decreased period of infirm senescence. The question is crucial not only because of its economic implications but also because recent demographic research suggests that population ageing, while initially entailing an improvement of the health status and behaviour of ageing people, will eventually lead to the emergence of very old and frail populations* (Neilson, 2006: 152).

Similar arguments are raised yet countenanced by Christine Overall's seminal study on population ageing and longevity, *Ageing Death and Human Longevity: A Philosophical Inquiry* (2003). In her book Overall stresses the "qualitative" over "quantitative" aspects of human longevity, and denounces the arguments that human ageing is negative in terms of the impact on the perceived 'costs' to society. Instead Overall focuses on the rights of human beings to live longer under the aegis of pursuing freedom, happiness and fulfilment at all costs. As she suggests:

> *Indeed, a prolonged life creates prospects for self-transformation, for re-creating one's identity by adopting innovative life plans, different values and new goals. Many human beings, perhaps the vast majority, never have the chance to fully explore all their potential as physical/emotional/moral/intellectual beings. A more prolonged life would provide at least some of that missed opportunity. Given the resources and opportunities, human beings are capable of changing their lives, often even in the face of oppressive or debilitating circumstances. Contrary to stereotypes about disadvantaged or ageing people (or those who are both), the potential for this versatility and flexibility is a fundamental characteristic of all human beings at all ages* (Overall, 2003: 184-5).

Overall's thesis ultimately rests on the right of the individual over the perception of a collective good, and stands in direct opposition to advocates of 'death with dignity', in particular, US Surgeon General Leon Kass, one of the most recognised and outspoken pro-longevity and biotechnology detractors. One of the key arguments that stem from this side of the pro-longevity debate regards the imminence of the "national nursing home scenario" (Kaplan, 2004: 2), part of the previously mentioned "dementia epidemic" (Access Economics, 2003). A critical issue already faced by developed countries with large Boomer populations is the prospect of further 'somatic' life extension without a corresponding advance in 'cognitive' resilience to age related disease such as dementia. Such a scenario could be considered irresponsible if not outright maniacal given the already significant increase in human life expectancy both present and forecast, and the biopolitical problems associated with them in the first instance. Indeed, it is more than likely that the rates of age related disease such as dementia will escalate given further advances in life extension technology. As Robine and Michel argue, any further increase in life expectancy will produce new types of age related disease as the population ages beyond its current levels (2004).

Thus the burning issue critical to this thesis is not whether enhanced human longevity should be encouraged (Neilson, 2006: 152), for this thesis takes the position that such an argument is in many ways 'moot' given that the processes for, and vested interests in, this development are well established in both intent, mass, and trajectory. Much of the debate regarding pro-longevity concerns itself with the virtue and vice of whether or not to promote or condone anti-ageing practices. I believe these energies are misdirected, for there is nothing legislated to constrain or outright hinder progress (on the contrary, the biopolitical logic inherent within these debates clearly encourages such potential), and moreover, whatever moralist judgement determines virtue and vice, people will do it anyway! In a deregulated, (neo-liberal) de-territorialised (globalised) milieu (provided one has the financial resources to do so), anything (or at least the promise of it) already is possible in a globalised marketplace (Schepeur-Hughes, 2002; Rose, 2001; Waldby, 2005). Anthropocentric 'choice' in this regard will, nine times out of ten, choose life, no matter how painful, absurd, and chimerical it can be. As Momeyer says: "So long as there is the slightest prospect of satisfying experience – not even a majority of such experience, but the possibility of it – human beings endure abysmal suffering and hope for more and better life" (1988: 22-23). Overall concludes her argument with similar conviction:

> *I'm in no way convinced that contemporary human beings have yet reached the point at which the human life is long enough. In fact ... given a minimal level of health and well being, a much longer life would almost certainly be desirable for large numbers of people* (2003: 182).

The critical question for this thesis is not one of whether or not such developments will or should take place. What is at stake is the *way* in which it happens, and how such practices can be informed by ethical narratives that serve to generate a 'quality' of extended life in proportion to the anticipated increases in the 'quantity' of life produced by biotechnological enablements and enhancements. If, as this thesis argues, people are going to do it anyway (and the biopolitical mandate demands they do in the first instance), how can this process be informed so that it empowers the ageing individual, in turn benefitting both them and the wider society in which they are

situated? I will argue here that it is not so much a case of stopping such developments (which I claim is close to impossible) as it is one of ensuring that inevitable change has a sound ethical platform based on the greatest benefit for the greatest number of people *biopolitically*.

In this context, if biopower is to be faithful to its core concern, to ensure the optimisation and maximisation of all human life, then there are crucial mitigating factors that haven't been addressed, indeed, that far outweigh the subject matter of life and death as it is outlined thus far. What is an infinitely more important question to be addressed in the context of the continued longevity of ageing populations is their further contribution, by not dying, to an already exponentially growing world population, and how the continued longevity of this resource intensive group will further compromise the planet's carrying capacity for all the world's citizens?

Conclusion

This thesis will now take a distinct turn that severely problematises the biopolitical agenda of optimising and maximising the life of ageing populations, given the wider biopolitical population that is subject to the criticality of biospheric issues that threaten to erode the very context into which ageing populations are planning to live longer into. The delay of senescent decline and the disruption to natural succession that immortalist biopolitics produces, in particular maintaining the highly resource intensive "non-negotiable" (Bush, G.H., 1992) way of life that Boomers, and in turn, the rest of the species – developed and developing alike – have grown/are growing accustomed to, means we now arrive at two incommensurate biopolitical aims; what I call the 'biopolitical paradox'. Here immortalist biopolitics is emblematic, albeit the quintessential emblem, of the logic of perpetual and unlimited growth, endorsed as it is by the dominant organisational characteristic of contemporary biopolitics, economic rationalism. Immortalist biopolitics thus extends the potential for unlimited growth to an unlimited timeframe in which to consume resources and pollute what is an already chronically depleted and compromised planetary context. As the following chapter illustrates, there is a pressing need to seriously and swiftly address the Biopolitics of the Biosphere, the opposing side to the biopolitical paradox.

Chapter 5: The Biopolitics of the Biosphere

If the present growth trends in world population, industrialisation, pollution, food production, and resource depletion continue unchanged, the limits of growth on this planet will be reached sometime within the next one hundred years. The most probable result will be a rather sudden and uncontrollable decline in both population and industrial capacity (Meadows, Meadows, Randers & Behrens, 1972).

The resource limits of the planet provide a definitive argument against making immortality (pro-longevity/life-extension) a tenable social goal (Christine Overall, 2003: 153).

So much of what we construe to be among our entitlements to perpetual progress may prove to have been a strange, marvellous, and anomalous moment in the planet's history (James Howard Kunstler, 2005: 12).

This thesis has already identified the two key burdens that are likely to be produced by ageing populations. The first of these involves critical labour shortages, the result both of Boomers retiring from the workforce and the need to provide additional care and services to support a significantly larger ageing population. Second is the strain on existing ageing infrastructure and material resources, given the need to construct the additional retirement homes, hospitals, medical facilities and supporting industries currently ill-equipped to deal with the anticipated growth in the number of aged and ailing persons in Western developed societies. There is however one critically neglected factor when considering the ongoing burdens produced by ageing populations that severely problematises the aims of any pro-longevity quest, indeed *eclipses* any of the above mentioned biopolitical problems stemming from ageing populations in scale, scope and consequence.

In addition to the three 'life' or 'bios' themes elaborated upon thus far in this thesis (biology, biopolitics and biotechnology), I will now introduce the fourth 'bio' into this equation, one that is both traditionally and contemporaneously neglected in the context of other bios, yet is integral to the operations of these in that its current degradation threatens to subsume and override the sovereignty or urgency of any and all of them in its all pervading omnipresence and omnipotence. This thesis will now dedicate itself to an analysis of the 'biosphere', that being the environment – or more accurately – the critical ecology to which all other factors in the bios equation depend.

Crucially, the historical relationship between the biosphere and other bios is one of massive compromise of the former to the benefit of the latter/s, a compromise that as the argument above suggests, will continue to accelerate at an ever increasing pace and intensity, given the biopolitical quest to produce longer living and therefore more resource taxing, pollution intensive Boomer populations. This chapter investigates the delicate ecological balance of the biosphere, and how the compromise of it has reached the point where its capacity to carry, sustain and reproduce any and all of the other bios in their current format is severely diminished. This sudden shift in focus entails a significant departure from the concentration on ageing populations outlined thus far. In this way I am opening up the biopolitical argument to question how the current biopolitical system operates to optimise and maximise the lives of populations

as a globalised whole, irrespective of demographic, nationalistic, racial or class boundaries.

The Long Emergency

The term 'sustainability' is commonly understood through the popular Brundtland definition as being "the ability of the current generation to fulfil their needs without compromising the ability of future generations to provide for theirs" (United Nations, 1983). Contrary to this most basic human ethical responsibility, the practices and lifestyles of predominantly Western human beings since the advent of the industrial revolution over two hundred years ago have severely compromised the ability of future generations (future generations that will increase total world population an additional 50% to that of today in less than 50 years (U.N., 2007)) to provide for their needs. The argument of this thesis thus far, that a disruption to natural succession catalysed by an increase in the longevity of the most resource dependent demographic to have ever lived, is reflective of but one dimension of the scale and scope of the *un-*sustainable that plagues the world today. The key questions critical to this analysis are the expected timeframes around which the un-sustainable becomes just that; bluntly, the point at which the very existence of human life within this biosphere is no longer tenable. The irony in this equation is that despite human ingenuity and our exosomatic ability to 'master' our environmental domain to the point where the 'keys to immortality' are supposedly at our fingertips (DeGrey, 2005; Kurzweil, 2006; Kurzweil in Ptolemy, 2011), at one and the same time the very scientific and industrial paradigm that brought these possibilities into being has by proxy created conditions that now threaten the tenability of that very life upon the earthly context that predicates it.

I will now identify and elaborate on what these anthropogenic threats to the biosphere (and by proxy, humanity itself) are, and specify how the increased longevity of human beings, in particular the Boomer demographic cohort and their chronically resource dependent lifestyles, will accelerate the entropic processes that are likely to compromise not only future generations, but present ones, given the criticality of our collective anthropogenic impact on the biosphere in the present and near future. To do this I will address the issue of the un-sustainable in four distinct parts that, combined, produce an "emergent condition for which there is no name" (Fry, 2011), where the *more than the sum of its parts* forms a system of entropic decay *par excellence*. In order these four dimensions are: overpopulation, resource depletion, global warming (or climate change) and species extinction.

1. Overpopulation

Since the 1960s many have warned of the consequences of overpopulation, none more popular than US biologist Paul Ehrlich, who in *The Population Time Bomb* (1968) forecast mass starvation as the inevitable result of unrestrained population growth. Ehrlich's prediction reflected that of Malthus (1798) who suggested nearly two centuries earlier that the human population was growing faster than the rate of food production could increase to meet population demand. The dire consequences of overpopulation, however, failed to manifest both in Malthus' time and in Ehrlich's, largely due to the 'Green Revolution' that occurred between the 1940s and the 1970s, leaving food production per person today "as good at any time in human history"

(Lowe, 2009: 5). It is popularly understood that this long running infatuation with population pessimism, twice proven wrong, is driven by millenarianist fear and a lack of faith in human ingenuity. As stated by Howard Kunstler, our species' collective success in this regard has fuelled the attitude that human population growth could continue exponentially:

> *This led to a new generation of idealists (including cornucopians such as economist Julian Simon) to proclaim that hypergrowth was a positive benefit to society because the enlarged pool of social capital and intellect would inevitably lead to fantastic new technological discoveries that would in turn permit the earth to support a greater number of humans – including social or medical innovations that would aid eventually in establishing a permanently stabilised optimum human population* (Kunstler, 2005: 7).

In pre-industrial 1800 the Earth supported a population of approximately 1 billion people. It took well over 100 years of industrialisation before that population doubled to 2 billion. *Less than* 100 years since then, the world's population has tripled to reach now over 7 billion (US Census Bureau, 2011), and is set to reach 9.2 billion by 2050 (UN, 2007). As Megan Clarke from the Commonwealth Scientific and Industrial Research Organisation (CSRIO) states, between now and 2050 the world will have to produce as much food as it has *ever produced* (since the time of the ancient Egyptians 8,000 years ago) to feed this growing population (Clark, 2009). In the timeline of human history such an exponential rate of growth of any kind is unprecedented, and – given the closed loop limited resource system that is planet Earth – is a growth grossly out of register with a biospheric support base that does not magically increase 'carrying capacity', but on the contrary is showing distinct signs of chronic depletion and irreparable damage. This is evidenced by both the decreasing availability and potential future supply of natural resources that enabled such a rapid and explosive growth of population in the first instance, and the flow on effects of a collective degradation of the interconnected ecological elements and systems that make life possible.

The most critical depletion of immediate concern to the rapidly growing human population is the capacity to produce food which, as argued by Lowe in line with the positions of Malthus and Ehrlich, is in decline: "Most of the indicators of food production per person – grain, meat and fish per person – have peaked and are now declining slowly, pressuring us to embrace risky approaches like genetic modification to food crops to boost production" (Lowe, 2009: 5). Lowe believes human beings face an imminent situation in terms of overpopulation, one that is unforgiving in humanist terms, based not on ethics or morality but on biological systems theory that extends to all manner of life, be it species population, viral growth patterns or any other form of bios in a closed loop system. He explains:

> *We face a fundamental biological fact: no species can keep increasing its numbers in a closed system. Sooner or later the population of any species is stabilised or reduced by natural forces: predators, disease, the limits of the food supply or the limited capacity of natural systems to process waste. The total human population is still growing at about 80 million people a year, or about a quarter of a million a day ... the demographic community ... predict that the world population will peak at about nine billion, while others see it going even higher ... Unless there are large scale disasters or unforseen*

outbreaks of disease, there will be about 1.5 times as many people on the planet in the middle of this century as there are now. That means we will need 50% more food, water and other resources than we currently use for allocation per person to remain at the present level (Lowe, 2009: 6).

Put into context, food is but one dimension of the resource problem that, given the exponential rate of population increase, cannot be sustained at either current or future levels required. Though food is seen as being the most critical resource, its supply is inextricably bound to that of other resources essential to its production, namely water, fertiliser (phosphorous), and most critical of all, oil. Used to drive the industrial scale machines and produce the pesticides and synthetic fertilisers that enabled the 'Green Revolution' of the mid twentieth century (the collective technological achievement that dramatically increased our capacity to produce food to feed the rapidly expanding global population) to occur, the diminishing supply of oil, for which a viable alternative remains highly speculative (Kunstler, 2005: 100), has profound, indeed compound repercussions for humanity. As the coming analysis will reveal, the massive sextupling of human population over the past two hundred years is predicated almost entirely on the exploitation of this fundamental resource that in the closed loop system of planet Earth can be likened to an "algal bloom" (Catton, 1980: 168), a brief explosion predicated on a 'temporary' oversupply of nutrients.

2. Resource Depletion: Peak Everything

Currently, the planet's renewable resources are being used up at a rate 25 per cent faster than they can be renewed, and the ecological human footprint (averaged over the global population) has tripled since 1961 (Fry, 2009a: 4).

Fossil fuels are a unique endowment of geologic history that allow human beings to artificially and temporarily extend the carrying capacity of our habitat on the planet Earth (Kunstler, 2005: 31).

In the previous section Lowe referred to the fact that food production may have "peaked". This is not an arbitrary term used by Lowe, for 'Peak Theory' as it is understood is applicable to all non-renewable resources in the way they are discovered, exploited, and ultimately depleted. Peak Theory was invented by Geoscientist M. King Hubbert in 1956 to describe the way finite resources follow a bell shaped curve from discovery to exponential increase and inevitable decline. It is based on the observation that the amount of any resource in any particular region is finite, therefore the rate of discovery which initially increases the extraction of that resource must reach a maximum point before it ultimately begins to decline. In the scheme of peaks there are many, as articulated in the book *Peak Everything* (2007) by Richard Heinberg, who outlines the various cases that the key resources to human success and survival are fast running out. The most critical of these relevant to food production is phosphorous, which is vital to the fertilisation of mass production crops. The US was the world's third largest holder of phosphorous rock; it is already passing its phosphorous peak. It now imports most of its phosphorous requirements from the world's largest supply of phosphorous rock in the Western Sahara Desert. China, who also has one the world's largest three holdings, has recently placed a 135% tariff (Global Phosphorous Research Initiative, 2010: 4) on the export of its phosphorous rock, the literal equivalent of an embargo.

Of all resource 'peaks' that face humanity at present there is none more important and visible throughout the media and the popular imagination than that of *Peak Oil*. Hubbert's prediction that the oil supply would peak in the US in the 1970s was accurate, and became glaringly apparent when, as US oil supply diminished in the 1970s, the Middle East constricted its supply creating a near catastrophe for what was at the time the world's largest oil consuming nation. This same situation is now becoming manifest albeit on a global scale, with the vast reserves touted by the oil magnates of the Middle East, Saudi Arabia in particular, to be the product of over speculation and quite possibly fabrication by as much as 40% (Merchant, 2011). Indeed, latest reports suggest that the onset of the "oil crunch", the period immediately after peak oil, is already in train. By as early as 2012 this will involve "sharp increases in the cost of travel, food, heating and retail goods" (Peak Oil Taskforce, 2010), not to mention the effect this will have on the people of poor and/or developing countries.

The exponential growth in human population can largely be attributed to the access it has had to the cheap and readily available supply of stored energy (sunlight) in the form of oil. This one time, finite endowment of cheap energy has created an artificial population bubble in which every sphere and aspect of that bubble is predicated on the cheap and constant supply of this non-renewable resource. As stated by Kunstler, although there is an atmosphere of faith in the potential for human ingenuity to foster and develop alternative fuel sources prior to the decline of oil, the large-scale implementation of a renewable energy supply, such as the much touted 'hydrogen' economy, is itself highly speculative and entirely dependent on enough oil reserve to power the existing infrastructure to re-tool the world's infrastructure to a life without oil:

> *To some degree, all of the non fossil fuel energy sources actually depend on an underlying fossil fuel economy. You can't manufacture metal wind turbines using wind energy technology. You can't make lead acid storage batteries for solar electric systems using any known solar energy systems* (Kuntsler, 2005: 100).

The transition to a renewable energy economy requires the full dedication of what remaining fossil fuel resources there are. With last remaining portion of the planet's one-time oil endowment being used (squandered) faster than it ever has been, and ever will be, over the coming ten to twenty years, makes the possibility of re-tooling global infrastructure in time highly unlikely. The political, economic and social consequences that hinge on the diminishing supply of oil (the West's relationship with the Middle East in recent years for instance) belie the follow on problems produced by them that I argue are significantly more critical longer term. Resource depletion is not solely determined by population growth *per se* but more so by the lifestyle practices of those populations, both developed and developing alike. Thus, the corresponding effects of population growth, and more importantly, I will argue, the lifestyle practices within them, leads to the next section in 'the long emergency' equation, the elephant in the room as far as biospheric instability is concerned. Add swathes of perennially ageing, resource dependent (highly resource intensive) Boomer populations to this equation, and the result is the possibility that the intentions of even these most hedonistically audacious and thus far enduring of demographic cohorts, may be overridden by a larger, more powerful and unforgiving force.

3. Global Warming (or Climate Change)

> *As it gets hotter in southern Australia, more people are getting air-conditioners, so they are burning more dirty coal to fight off the effects of burning more dirty coal. As rails buckle and cooling systems fail, commuters abandon public transport and drive cars, thus burning more oil to avoid the effects of burning oil – and leading to political pressure to squander more of the infrastructure budget on wasteful road schemes. With rainfall declining, several States are building desalination plants, using electricity to combat the effects of electricity use. So Australian greenhouse pollution is spiralling out of control. Each year there are more of us and each year we use, on average, more dirty fossil-fuel energy. That is why our energy-related greenhouse pollution is now a third greater than it was in 1990* (Lowe, 2009: 17).

The politically driven agenda of governments and institutions have in recent times been more inclined to euphemise the process of 'global warming' as 'climate change', primarily because global warming is not considered a technical term, referring to a short to medium term increase in the average surface air temperature, which could in turn become global cooling, as the natural fluctuations in the Earth's climate record attest. Saying that, the euphemism 'climate change' waters down any alarming reference to the significant increases in surface air temperature over the past 60 years, and accounts for the possibility that such a process of warming may not be the direct result of anthropogenic influence. However, the increase in the average temperature of the Earth's surface that has been occurring since the middle of the twentieth century, that is continuing to escalate at an accelerating, exponential rate, is in the overwhelming opinion of the majority of the scientific community, the direct result of anthropogenic influence (IPCC, 2007). Nevertheless, political and public debate continues as to the validity of these claims. Despite this scepticism, overcoming climate change is increasingly seen as the greatest challenge our species has faced in the entirety of its existence, more critical than the threat of annihilation from the cold war and the two world wars preceding that.

The scale and complexity of the problem is far too large to warrant an in depth analysis here, however I will endeavour to cover the basic tenets of it using some of the more well known documents that detail its potential impact upon the biosphere. One of the most widely cited and popularly understood analyses of the impact of climate change comes from Professor Lord Nicholas Stern, who was commissioned by the parliament of the United Kingdom to produce *The Stern Review on the Economics of Climate Change* (Stern, 2006). In brief I will summarise some of the key critical impacts of climate change suggested in this review.

Stern Review **(2006)**

According to the *Stern Review* on current trends, average global temperatures will rise between 2 - 3°C within the next 50 years (Stern, 2006: 6). Continued warming will have many other impacts, several of which will be the result of changes to the supply of water (ibid.: 6). Melting glaciers will in the short term increase the risk of flood (ibid.: 6), then rapidly reduce water supply, eventually threatening one-sixth of the world's population in the Indian sub-continent, parts of China, and the Andes in South America (ibid.: 6). Declining crops in Africa in particular could leave hundreds of millions without the ability to produce or purchase enough food to survive (ibid.: 6).

At mid to high latitudes crop yields may increase for moderate temperature rises (2 - 3°C), but then decline. At 4°C plus, global food production will be seriously affected (ibid.: 6). In higher latitudes cold-related deaths will decrease, however in lower lying areas global deaths in the form of malnutrition and heat stress, not to mention the rise of vector-borne diseases such as malaria and dengue fever, will considerably increase (ibid.: 6). Rising sea levels will cause hundreds of millions more people to be flooded each year (ibid.: 6). It is possible that by the middle of the century 200 million people could be permanently displaced from rising sea levels, heavier floods, and more intense droughts (ibid.: 6). Ecosystems are especially susceptible, with 15 - 40% of species potentially facing extinction after only 2°C of warming (ibid.: 6). Ocean acidification as the result of rising carbon dioxide levels will seriously affect marine ecosystems with adverse consequences on fish numbers (ibid.: 7). Developing countries will find it increasingly difficult to continue developing, and global financial markets will become more (and more) unstable through disruption to production and higher costs of insurance (ibid.: 8).

One of the critical issues to stem from the *Stern Review* concerns the 'accuracy' of its assumptions. Released in 2006, it was immediately criticised for being too extremist in its view, tending toward worse case scenarios and painting a dismally bleak picture of what to expect from higher concentrations of greenhouse gases in the atmosphere (APEC Study Centre, 2007: 3). On the contrary, in lieu of emerging data that demonstrate rates of temperature warming, ice cap recession and sea level rise were much higher than anticipated, the *Stern Review* was criticised for being too conservative in its estimates (Gilder, 2006). As a recent media release from Britain's Met Office attests:

> *Global temperatures may be 4 degrees Celsius hotter by the mid-2050s if current greenhouse gas emissions trends continue ...* [echoing] *a United Nations report last week which found climate changes were outpacing worst-case scenarios forecast in 2007 by the UN's Intergovernmental Panel on Climate Change* (Australian Broadcasting Commission, 2009).

The year following the Stern Review, the Intergovernmental Panel on Climate Change (IPCC) produced the *Fourth Assessment Report: Climate Change* (2007) that in large echoes the projections of the *Stern Review*, concurring that a 2 degree mean increase in global temperature is the threshold before the onset of what can be termed 'catastrophic' climate change. Many scientists however, argue that this 2 degree figure underestimates the complexity and sensitivity of the biosphere, where even the slightest temperature increase acts as a catalyst to broader chains of events that could swiftly take the mean global increase much higher (Jaeger and Jaeger, 2010). As more data appears on rates of glacier and ice cap recession, sea ice and permafrost melt, and ocean acidification, the evidence unanimously suggests these processes are accelerating, and accelerating faster than at first thought (Synthesis Report, 2009; Garnaut, 2011; Climate Commission, 2011). As argued by Fry, how these translate on the ground belie the pre-occupation with statistics *per se*:

> *The rate at which polar ice is melting indicates that sea levels are rising much faster than was initially expected. Even if the levels only rise by half the 7 metres expected by the end of the century, there will still be an enormous amount of suffering ... the World Bank, the International Red Cross and a diverse range of experts are talking about 500-750 million plus environmental*

refugees by 2100. The figure may be more or less; either way global redistribution on an enormous scale is almost certain. Rather than numbers moving in a steady stream over time, the more likely occurrence will be in waves as major climatic events happen (Fry, 2009a: 5).

Despite the best intentions of predicting what, where and when climate change events will happen, the volatility of the variables that underlie our climate models means they can rarely ever be accurate. As opposed to the idea that the effects of climate change will occur gradually over time, it appears instead that they will cascade, gathering pace exponentially in a positive feedback loop that could destroy the key conditions for human life well before the end of the century (Climate Commission, 2011). As the exponential increase in the rate of natural disasters – "four times as many in the last 30 years than in the previous 75" (Gore, 2009) – suggests, the adverse effects of climate change are already being felt, the extreme weather events across the globe in 2011, Australia no exception, being testament to this. Despite this sobering prospect, the IPCC recommends that in order to avert catastrophic climate change the world needs to peak net emissions by 2015, and achieve a target of zero emissions by 2050. Modelling the future effects of climate change clearly requires caution and humility, given that the results are specific to the model and its assumptions are dealing with unprecedented effects upon an ecosystem as large, complex, intricate and as sensitive to change as the biosphere of the Earth. They should not be endowed with a precision and certainty simply impossible to achieve, however neither should they be placated, watered down and ignored, as is the global status quo concerning climate action. Even though a two degree increase is now popularly perceived as safe (because it is not 'catastrophic'), the chain of events set in motion when this level is reached, or perhaps even well before it is reached, could themselves be catastrophic. The already melting permafrosts of the northern hemisphere, that are releasing vast amounts of methane gas, causing an accelerated warming cycle that will acidify the oceans, causing mass marine die off, that in turn releases even vaster amounts of methane gas, et cetera, et cetera, leads to the point where the Earth could reach a 7 degree mean increase in average global temperature *well* before the end of the century (Climate Commission, 2011), a point at which the conditions for human life are no longer tenable. Given the relatively stable set of climate conditions over the past 12,000 years that have led to the rise of the 'civilised' human being, such a swift shift in climatic conditions does seem improbable from our present vantage point. Nevertheless, despite the prevailing scepticism that climate science is confabulatory and inflammatory, rates of species extinction, of which global warming is a key contributing factor, strongly suggest otherwise.

4. Species Extinction

As mentioned above, one of the greatest consequences of global warming is not only the increasing severity of the conditions that make life possible, but more so, the distinct and growing possibility that such conditions could extinguish life as we know it altogether. A review of the current rates of flora and fauna extinction reveal:

Of the earth's estimated 10 million species, 300,000 have vanished in the past fifty years. Each year, 3,000 to 30,000 species become extinct, an all time high for the last 65 million years. Within one hundred years, between one-third and two-thirds of all birds, animals, plants, and other species will be lost (World Watch, Jan/Feb. 1997: 7).

Richard Kingsford, lead author on a 2009 collaborative research review on conservation in the Oceania region, suggests that the rates of species extinctions we are witnessing now "are increasing. They are certainly a lot higher than the background rates of extinction that you would see in the evolutionary record. Maybe 1,000 to perhaps 10,000 times that rate and that's occurring right across all organisms" (Kingsford, 2009). So sensitive to anthropogenic influence is the biosphere that small changes in one domain affect the interconnected networks of the Earth's ecology in ways we can only begin to fathom, let alone manage *biopolitically*. Accelerating rates of species extinction suggests serious implications for a humanity that enjoys a classificatory distinction from the flora and fauna it hierarchically subordinates and instrumentalises. The vast interconnected networks of the Earth's ecologies could, due to relatively small changes in their interactive patterns, simply fail to support each other in the mutually symbiotic way they have over millions of years. At a certain critical point the anthropogenic abuse of our complex ecologies could well literally mean the end of the salubrious conditions that have enabled human life to thrive. Indeed, the individual who generated the hypothesis that life on Earth is the result of a mutually interdependent combination of elements and forces is unequivocal in his estimation of the current state of affairs.

James Lovelock rose to prominence in the late 1970s with his controversial yet ultimately widely accepted hypothesis that the Earth was a self-regulating super-organism. *Gaia: A New Look at Life on Earth* (1979), stated emphatically that the largest living thing on Earth is Earth itself. Comparing the stable atmosphere of Mars to the chemically dynamic conditions of the Earth, Lovelock detailed how the complex system of Earth worked to catalyse the conditions for complex life. During the 1960s Lovelock discovered that the biosphere, atmosphere, hydrosphere and lithosphere were integrated in a single system within which they interacted. The system balanced surface temperature, the condition of the atmosphere and the salt content of the oceans, evening out the temperature of the sun to produce a relatively stable equilibrium conducive to life. Lovelock first called this the "earth feedback hypothesis". Feedback, a term more familiar with cybernetics, anthropogenic in origin, is the situation whereby a part of the output of a process returns to affect the input. Given that such a complex and delicate system as the Earth has enabled the conditions to be just right to produce and sustain life, Lovelock fancifully perceived such a system to be animistic, indeed benevolent, thus he named it *Gaia*, inspired by the mythological Greek goddess of Earth. Lovelock originally wanted this name to represent the benevolence of an Earth mother. Now however he believes that our abuses of the planet are making this system work against us malevolently. Lovelock sees climate change as the single greatest threat the human world has ever faced, that it is impossible to solve and will soon destroy civilisation as we know it, perhaps within the lifetime of a person born today. Lovelock's most recent book *The Vanishing Face of Gaia: a Final Warning* (2009), details what he believes will be a mass extinction event, with up to 90 % of the total human population wiped out by the end of the century. Contrary to the relatively stable conditions that created the benevolent Earth, a malevolent Earth results from the melting of the Arctic sea ice that, as it disappears, destroys much of the bright surface that reflects back much of the sun's rays. Left with only dark ocean the Earth absorbs more heat that inevitably leads to more melting, compounding the effects of this positive feedback loop. Lovelock argues that both the Stern Report and the Fourth Assessment of the IPCC

(accused of exaggeration by the Bush administration) have in fact grossly *underestimated* the speed at which climate change is happening, and that there is little left for us to do. He believes we should abandon endeavours to produce renewable energy and simply concentrate on survival, which, ironically, he prescribes through the large scale development of nuclear power!

Lovelock's grim assessment of the current state of affairs can be elucidated by exploring further the notion of feedback that he uses to describe the Gaia hypothesis and how it applies to entropy, the second law of thermodynamics. This will articulate in another way how the various systems that constitute the biosphere operate, and why they have become so critically compromised. I will argue here that the law of entropy describes at one and the same time the problems associated with the biosphere, and for the purposes of this thesis, potentially, the keys to its negation, vital as they are to the 'generative solutions' that comprise the latter chapters of this thesis.

Entropy

Entropy describes the degree of disorder or uncertainty in a system which applies to the degradation of the matter and energy in the universe to an ultimate state of inert uniformity, or the death of distinct organisational patterns. The first law of thermodynamics states that energy cannot be destroyed or created, only changed. The second law of thermodynamics, entropy, stipulates that the change of state in any amount of energy flows in one direction: from being concentrated in one place to becoming diffused or dispersed or spread out; from being ordered to being disordered. This is the reason objects and entities in the real world do not fall apart all at once because the flow of entropy, the way it diffuses or disperses, faces complications that obstruct or constrain it. Straight forward ordered flows of entropy drain complexity a lot quicker than complexly disordered flows. What this means essentially is that 'efficiency', the central rubric of 'economic rationalism', is the surest most effective path toward the drain or entropy (death) of that system.

Similar to the arguments presented by Lovelock above, the feedback loops created by human beings are self reinforcing and therefore do not preserve the richness of diversity required to maintain the complex web of biospheric interconnections that create the emergent conditions for life. Anthropogenic systems instead tend to favour ordered, efficient flows, producing monocultures that compromise life-creating diversity. Efficiency, the epistemological basis upon which human abstraction from biospheric complexity operates so successfully (in its own, self-reinforcing terms), is accelerating the entropic decay of the Earth's complex systems to the point where they can no longer maintain the relatively stable state of dynamic equilibrium that gave rise to complex evolved life such as humans. Howard Kunstler provides an incisive contextual example that illustrates how the beginnings of a positive feedback loop now lead to the predicament faced by 21st century humanity:

> *When trees grew scarce in England because of the Little Ice Age (1560-1850), people there began to use more coal to keep warm, which caused people to dig deeper for it, which called forth the innovation of the steam engine to drain water from the mines so the miners wouldn't drown. However, an interesting positive feedback loop was set in motion. The invention of the steam engine (a magical product of human ingenuity) provoked the invention of other new machines, and then of factories with machines, which prompted*

the need for better indoor lighting, which stimulated the use of petroleum, which produced better light than candles (and was much easier to get than sperm whales), which provoked the development of the oil industry, whose oil was found to work even better in engines than coal did, which led to the massive exploitation of a one-time endowment of concentrated, stored solar energy, which we have directed through pipes of various kinds in an immense flow of entropy, which has resulted in fantastic environmental degradation ... The solar energy stored for millions of years in oil will now be expressed in higher temperatures, more severe storms, rising sea levels, and harsher conditions for the human species, which, despite its exosomatic technological achievements, remains a part of nature and subject to its laws (Kunstler, 2005: 193-4).

Since the advent of the fossil fuel era the human population has sextupled, which demands the ability of finite resources to keep up with maintaining not only the existing population, but a rapidly multiplying one increasingly preoccupied with the trappings of resource dependency via the practices of Western consumer capitalism. The era of globalisation as the supreme culminating point and quintessence of 'neo-liberalism' has accelerated this process exponentially on the closed loop system of planet Earth. That such a system exploded into prominence only relatively recently (the human population sextupling in just 200 years) can be likened to a gold rush, or as William Catton describes in *Overshoot: The Ecological Basis of Revolutionary Change* (1980) an "algal bloom", the result of a temporary rush of nutrients (primarily oil) in one brief season:

Detritus ecosystems are not uncommon. When nutrients from decaying autumn leaves on land are carried by runoff from melting snows into a pond, their consumption by algae in the pond may be checked until springtime by the low winter temperatures that keep the algae from growing. When warm weather arrives, the inflow of nutrients may already be largely complete for the year. The algal population, unable to plan ahead, explodes in the halcyon days of spring in an eruption or bloom that soon exhausts the finite legacy of sustenance materials. This algal Age of Exuberance lasts only a few weeks. Long before the seasonal cycle can bring in more detritus, there is a massive die-off of these innocently incautious and exuberant organisms. Their "age of overpopulation" is very brief, and its sequel is swift and inescapable ... When the fossil fuel legacy upon which Homo colossus was going to thrive for a time became seriously depleted, the human niches based on burning that legacy would collapse, just as detritovore niches collapse when the detritus is exhausted (Catton, 1980: 168).

The paradox of this situation is that as some members of the scientific community proclaim to be nearing the mastering of biology via molecular interventions (De Grey, 2005; Kurzweil, 2006), simultaneously we are on the verge of extinction via the erosion of the basis of life caused by the very processes of science, technology and industrialisation that herald the prospect of immortality in the first instance. Thus, contrary to the hyperbole of the prolongevity and transhumanist movements that proclaim the species is on the cusp of a technological "singularity" (Broderick, 2001; Kurzweil, 2005) or "Omega Point" (Teilhard de Chardin, 1959; Tipler,1997) – that which enables the possibility for an immortalist biopolitics to exist – it is possible to view this anticipated culmination from the opposing spectrum where an exponentially warming planet constitutes a temperature singularity – what environmentalists refer to

as an "ecological omega point" where "the vast interconnected networks of the earth's ecologies are so weakened that human existence is no longer possible" (Kunstler, 2005: 8). Technically, at this point it is temperature change (global warming) that is the single greatest problem the species faces in terms of possible wide-scale death and potential extinction. As Tony Fry declares:

> *We are now at a point where it can no longer be assumed that we, en masse, have a future ... For all the celebration of human intelligence, the culture of Western rationalism that came into dominance totally failed to comprehend and respond to the innate and subsequently amplified propensity of human centeredness toward being unsustainable* (Fry, 2009a: 1-2).

It would seem that in order to survive, we 'naturally' need to become the opposite of unsustainable, however in the complex interplay of dynamic systems, and in a cultural milieu where hypocrisy, ambiguity and the vested interests of the ruling elite reign, an all-out commitment to being 'sustainable' may not necessarily be 'the' solution, even if adopted *en masse*.

Toward a Biopolitics of the Biosphere: Sustainability

> *The path to hell is paved with good intentions* (Proverb).

The need to generate what I call a 'biopolitics of the biosphere' is paramount, as the 2009 climate summit in Copenhagen, the largest ever gathering of its kind boasting the highest number of countries ever participating in one single event, suggests. However, despite the near unanimous consensus that something significant needs to be done about climate change, agreements on how to do this, using what and involving whom, remain, tragically, well out of the reach. As Fry suggests, "Put badly: politicians are trying to manage circumstances over which they have little control and of which they have even less comprehension" (2011: 200). Climate change is a global phenomenon making it a particularly unique biopolitical problem in that solutions to it demand proportionate action from all people everywhere. Though climate change adversely affects poorer nations more critically in the short term, in the medium to long term all nations will suffer. In this sense the collective response to climate change is, as Lovelock suggests (2009), the single greatest challenge we as a species have ever had to confront. In this capacity, our propensity toward being unsustainable can be countered, 'naturally' speaking, by moves to become 'sustainable', hence the popularity of the term 'sustainability' that is championed as the principle discourse, movement and industry with the 'solutions' to climate change. As I and others argue however, sustainability as a discourse, a movement and an industry, is governed by a logic that renders its best intentions ultimately futile, primarily because its trajectories are hinged to maintaining two sets of natural conditions: one, the ability to restore the 'natural' equilibrium of the Earth's ecology through strategies to mitigate climate change; and two, the preservation of the 'natural' birthright to gratify and glorify the self via the excessive consumption of goods and services, otherwise known as "sustainable excess" (Fry, 2009b: 1). I will address both of these affiliations to the 'natural' separately.

The first way in which sustainability adheres to the fiction of the natural is through its designation of the 'environment' as a distinct and separate entity from the artificial or anthropogenic. Such a binary classification is problematic in light of the complex

interdependency and osmosis of these systems, of the 'natural' and the 'artificial' that are as much a part of each other as they are to themselves. The argument or distinction between nature/culture is an old one, going back to the ancient Greek distinction, described by Hannah Arendt in *The Human Condition* (1958), between *physis* (natural things that are by themselves whatever they are) and *nomos* (things which owe their existence to man; also law and the possession of territories). The critical argument about our habitual distinction between nature and culture is one dealt with by many prominent theorists, including Derrida (1976), Grosz (1989), Haraway (1989) and Foucault (2008). Two theorists who critique the anachronism of the natural in more recent times are Pia Ednie-Brown and Spurse.

Ednie-Brown explains how the notion of the 'environmental' is based on a perceived sense of the 'natural' which is historically constructed and thus a product of human consciousness more than it is a unique taxonomic entity:

> *But how might we make sense of the depths of the 'environmental'? What, after all, is the environment'? Often, it is equated with 'nature' and those things which are not human or cultural. Slightly more reductively, it is often defined as the non-biological surroundings that living things interact with, such as conventional definitions of ecology. Either way, environment is not us, it is the stuff we perceive to be outside ourselves. Being other than ourselves, it raises the issue of our relationship with it – and this relationship is changing along with the very defining limits of the environment ... Importantly, no environment simply exists, being always entwined with the complex of ideas and actions through which it is perceived and in which it becomes involved* (Ednie-Brown, 2009: 4).

Ednie-Brown cites the architectural theorist William Taylor, who provides an historical underpinning to this perceived nature/culture division. He suggests "environmental awareness was the result of efforts to accommodate nature, to make room, alongside people, for its forms and processes, species and inanimate matter through works of architecture and landscape gardening" (Taylor, 2004: xvii). Via Taylor, Ednie-Brown suggests that our collective pre-disposition toward creating an idealised separate entity we call the 'natural', is more a question of how we perceive ourselves: "Environmental awareness is linked to awareness of self. This is similar to the idea that knowing what you are is knowing what you are not, and vice versa" (2009: 4). Despite this historical legacy, Ednie-Brown resolutely argues that today such demarcations are passé, where "[e]cologies are ever altering, adapting and collapsing to the tune of human activity" (ibid.: 4). Peripatetic design collective Spurse similarly identify the problem of the natural that inhibits understanding and action in this current context:

> *Many contemporary theories of experience assume that there is a fundamental divide between the world as it is and how it is for us. This supposed divide, between us as fully socially and historically constructed beings, who understand the world through our socially situated position, positions nature as being an unreachable world somewhere out there. This is fundamentally untrue to our experiences ... How has it become that our engagement with nature is now to be one of only analysing and critiquing the various forms of historically contingent representations we are assumed to live within? The deep irony and threat of such a position is that the very possibility of action and engagement is limited to critique and a critique of representations at that,*

> *or belief – ideologies that insist on refusing the world – and in this moment of*
> *global crisis* (Spurse, 2008: 1).

In *Toward an Aesthetics of the Real*, Spurse suggest we need to "[d]rop the concept of Nature" altogether:

> *The so-called "natural world" has persisted as radically separate from "our"*
> *cultural/technological world, that the concept of nature is not only misleading,*
> *it endangers the potential for new paradigms. It posits that there is a world*
> *"out there", removing us from the world we claim we engage with. No matter*
> *how we rework the term, the conceptual logic of this divisive two worlds*
> *model remains. The reality is that we are of the world, and it is time for our*
> *thinking to move beyond the concept of nature* (Spurse, 2010: 1).

The problem with sustainability in this sense is its over reliance on discourses of the natural that fuel the perception there is such a thing as a 'natural', eternal, stable biospheric equilibrium to go *back* to. The utilisation of renewable or near renewable energy resources (10 percent, 50 percent, 80 percent and so on) to 'mitigate' the effects of climate change are but one strategy based on the fiction of the natural as an eternal, stable equilibrium that can be restored and preserved in the state it has been for the past 12,000 years. This is quite impossible. The unprecedented anthropogenic effect on the biosphere in the two hundred years since industrialisation has changed the operation of the inter-dependent, complex and dynamic systems of the biosphere in ways that have far reaching and ongoing consequences *ad infinitum*, consequences we can barely begin to fathom let alone maintain or 'restore' *biopolitically*. As the vast majority of the scientific community concur, while the generation of renewable ('sustainable') energy systems, be they solar, wind, geo-thermal etcetera, are important to securing a long term energy future (given the finite nature of 'non renewable' resources), they alone will not 'solve' the climate crisis, will not even come close. As many climate scientists agree (Jaeger and Jaeger, 2010), even if humanity were to cease emitting greenhouse gases into the atmosphere there is already enough there now to heat the planet well over the critical 2 degree threshold, the point at which catastrophic climate change is inevitable (IPCC, 2007). If the 'business as usual' model is maintained (and indeed it is expanding at an ever accelerating rate), we are likely to reach 4 degrees mean warming and severe environmental catastrophe by as early as 2050 (Australian Broadcasting Commission, 2009). Put simply it is too late to mitigate. What this means is that we will have to resort to adaptation measures which, technically speaking, render the ambitions of the sustainability movement to mitigate climate change ill informed and ultimately futile.

I return to this point in greater detail shortly, however for the time being I shall move onto the second way in which sustainability subscribes to the notion of the natural – through its adherence to the law of economic growth as a natural, inevitable condition we must all abide by. As previously mentioned, 'sustainability' as it is popularly understood through the Brundtland definition is "the ability of the current generation to fulfil their needs without compromising the ability of future generations to provide for theirs" (United Nations, 1983). This makes perfect sense except for the slipperiness of definition regarding what we consider 'needs' from 'wants', something modern human beings are prone to conflate. Sustainability occupies a unique position in this regard, for while it rhetorically claims to be 'the' solution to all forms of biospheric woe, it manages to do so all the while operating within the reigning

paradigm of economic rationalism, adhering to the doctrine of 'unlimited growth' thereby ensuring the sovereignty of Western hegemonic relations. As evidenced by journalist Gwynne Dyer, what "I want sustained ... [is] ... a high energy civilisation ... [and] ... I want everyone on the planet to live in wealthy societies" (in Fry, 2009b: 1). This is why sustainability often has the appendage 'development' succeeding it, with 'sustainable development' acting as the 'conscience', and therefore, justification for continuing the same policies and practices of unlimited growth under the aegis of Western economic rationalism. Such a position turns sustainability into merely another avenue for economic exploitation, rendering its best intentions futile as any authentic 'sustainable' pursuit is subsumed by the motive to maximise profit at all costs, illustrated in greater detail by Adrian Parr's 2009 book *Hijacking Sustainability*. Such a perspective is supported by prominent 'sustainability' luminaries such as Lord Nicolas Stern, author of the previously mentioned Stern Report. In a recent address to the National Press Club of Australia, Stern remained optimistic about the potential for the world to overcome the climate crisis though market mechanisms, in particular the possibility that we could soon reach a unanimous global consensus on fixing a price on carbon. He believes that we are now on the cusp of the 7th industrial revolution, the energy efficient, low carbon 'green' industrial revolution, that in the face of the great risks of climate change, also entails "great opportunity", namely 'financial' opportunity (Stern, 2010).

A major criticism of the *Stern Review* and his ongoing commentary on the issue is this fundamental concentration on the economic above all else. Indicative of the way the present social and political paradigm can only see the world in economic rationalist terms, the final findings of the report were translated in terms of percentages of GDP. As Bolchover and Solomon argue, "Stern inverted the problem; in order to develop, one must sustain":

> *Both the Stern Report and the Kyoto Protocol represent a strategic shift emphasising the economic imperative of climate change rather than the fear factor of environmental Armageddon. The threat of imminent meteorological disaster, starvation, drought and mass flooding do not seem to work. Only the likelihood of financial demise seems to trigger governmental action* (Bolchover and Solomon, 2010: 1).

Thus, similar to the way we can only see the biospheric problem as one taking place in 'nature', so too do we only see the answer to this problem in economic terms, with free market capitalism and market mechanisms representing another form of the 'natural' or "institution of the real" (De Certeau, 1986: 32) that inhibits, more than promotes, the search for genuinely viable solutions. Sustainability unquestioningly takes the economic mandate as a given, and follows the logic of growth, maintaining that "sustainable excess" (Fry, 2009b: 1) is not only possible but a 'natural' and therefore unalterable characteristic of the human condition. This paradoxical, oxymoronic development can be attributed to the historical relationship that has developed over time between humans and our earthly resources under the auspices of a 'natural', free market capitalism. Philosopher Patricia Glazebrook illustrates this process:

> *The scientific reduction of nature to reckonability, that makes possible the technological reduction of reckonable nature to resource, that in turn makes possible the economic reduction of reckonable natural resources ... to their exchange value constitute not "development" in any meaningful sense, but*

> *rather a downward spiral of destruction in which a small number of capitalists get rich at the expense of the rest of the planet's inhabitants. In the last iteration of this process, people are reduced to wage-earning consumers whose purchasing patterns render them complicit in the increase of deteriorating labour conditions, global scarcities, biodiversity loss, toxin generation, and greenhouse gas production. In short, consumer culture is engineering the next mass extinction. Humans who uncritically accept consumer culture as destiny are complicit in their own death* (Glazebrook, 2010: 2).

As the changing composition of the atmospheric coordinates of existence suggest, today every animal, plant, insect, bacteria, mineral, element, molecule, atom and quark carries the residue (or in some cases the viscosity) of anthropogenic influence. The idea that there is a distinct natural 'out there' and other to us is a fallacious notion attributable to the previously mentioned historical construction of the self as a mind/body (human/nature) split. For the self to posit itself as superior and all 'other things' subordinate, it had to instantiate itself as an island separate from that which brings it into being. This hierarchical privilege instrumentalises nature for its own gratification and glorification. Francis Bacon's famous maxim that we need to "put nature on the rack" in order to "extract her secrets from her" (Bacon, 1968) captures this attitude that sought to not only 'know' nature omnisciently but to then in turn use this knowledge to shape 'nature' omnipotently.

While we busy ourselves with an inherently flawed solution to biospheric woe in the form of 'sustainability', an adherence to the tenements of this principle in effect make the 'sustainable' advocate complicit in the very systems that generate biospheric instability in the first instance. Further complicating this process is sustainability's preoccupation with identifying incidences of 'green-wash', where the 'real' 'sustainability' is compromised by those only *acting* under the auspices of biospheric altruism for personal or professional gain. In the contemporary "climate of change", Ednie-Brown elaborates upon the modern sensibility of 'green' that, like sustainability, though fashionable to the palette of the times, is composed of many different shades, thus is plural, ambiguous, and uneasy as a metaphor: "If 'green' has become another word for 'environmental' or, of-the-environment, then we are part of its hue. But rather than this eliciting images of idyllic, natural settings, this green is increasingly about feeling rather unwell, nauseous, unstable" (Ednie-Brown, 2009: 4-5).

To historically locate the genesis of sustainability as it is used in today's 'green' lexicon, we find sustainability itself to have the preservation of economic interest at its core. In 1983 The United Nations-convened Brundtland Commission, from which we receive the previously mentioned Brundtland definition of sustainability, stipulated that its primary concern was "the accelerating deterioration of the human environment and natural resources and the consequences of that deterioration for economic and social development" (ibid.: 1983). Here, sustainability privileges first and foremost not human life and welfare that suffers as a result of the deterioration of the environment and natural resources, but the impacts of such deteriorations on economic and social development, further evidence of the economic as an unassailable 'natural' condition upon which human life and welfare are contingent. In this context sustainability itself is a form of 'green-wash', originating as a mode of bureaucratic rhetoric or 'spin' that has as its express purpose not the protection of

human life but the profit making enterprises that feed from it. Such a paradox mires any genuine impetus to seek ways out of our currently untenable situation. As design philosopher Tony Fry argues:

> *The leading nations of the international community (as was the 'G8' and so forth) are snared in a debilitating contradiction that the discourse of 'sustainable development' tries, but fails, to conceal. On the one hand they remain totally committed to global economic expansion within a system predicated on the idea of perpetual economic growth. On the other hand, they are aware that environmental impacts (especially those created by global warming as accelerated by greenhouse gas emissions) are a threat to their developmental objectives. 'Sustainable development', in this setting, is a 'have your cake and eat it' strategy ... the created ontological disposition of people to be unsustainable (because that is how they've been culturally constituted as economic and political subjects) is in no way checked by sustainable development* (Fry, 2011: 51).

The failure in the epistemology of what constitutes a genuine move toward sustainability in the context of what is at stake translates ontologically into merely another industry vying for profits in a market orientated culture. As Glazebrook re-iterates, the problem lies in the way we approach what we deem (epistemologically) as resource, and how that translates (ontologically) as 'material':

> *Ontologically, everything that is can be reckoned. Is it any wonder then that in contemporary practice, whether in the boardroom of a Canadian Logging Company, the hut of an Indonesian peasant, or the warehouse of Home Depot, the forest appears as nothing more than so many board-feet of lumber? Meanwhile the costs of deforestation, whether to the squirrel as habitat loss, to the peasant's wife as subsistence base destruction, or to the next generation who have one less place to play and one less carbon sink, appear at best as only "externalities"* (Glazebrook, 2010: 2).

These shortcomings to understanding the problem of the unsustainable translate further down the ontological line in the way top down institutional approaches continue to fail to act in the face of impending doom. As the Kyoto and the Copenhagen climate summits attest, where a genuine binding consensus on reducing greenhouse gas emissions appears improbable (indeed impossible) in the short to medium term, it deems these gatherings an exercise in bureaucratic delay, the only result being the now all too familiar refinement of the rhetoric *till the next round of talks*. Apart from the rigidity of human institutional, infrastructural and lifestyle arrangements making genuinely 'sustainable' change impossible, speculatively perhaps, the answer also lies in that entrepreneurial interests seek to preserve the context in which future lucrative financial opportunities reside. That is, maintaining the unsustainable invites the opportunity for technological advancement to direct itself toward new techniques and applications that engineer the Earth's atmosphere, thereby creating lucrative markets from which to ensure future profits. The following section explains this.

Too Late to Mitigate

As outlined in the previous section on 'sustainability', the reduction and ultimate halting of greenhouse gas emissions is simply not enough to avert the worst of

catastrophic climate change, making the situation more complex than is popularly thought or framed through the discourses of sustainability. Even if humanity were to cease emitting greenhouse gases into the atmosphere there is already enough there now (greenhouse gases have a lag effect) to heat the planet *well over* the critical 2 degree threshold, the point at which catastrophic climate change is inevitable (IPCC, 2007). Under a 'business as usual' scenario we are likely to reach 4 degrees mean warming by as early as 2050 (Australian Broadcasting Commission, 2009). To reiterate, it is 'too late to mitigate'. What this means is that we will have to adapt, and plans to do this are already established through two distinct streams of action, 'geoengineering' and 'bioengineering'.

A report by The Royal Society chaired by John Shepherd titled *Geoengineering the Climate: Science, Governance and Uncertainty* (2009), outlines several strategies to avert the worst of catastrophic climate change using geoengineering, the deliberate large scale intervention in the Earth's climate system. Techniques for doing this include: basic measures of absorbing carbon from the atmosphere (Carbon Dioxide Removal or CDR techniques) via wide scale tree planting and plankton enrichment through iron dumping in the oceans; measures that reflect and/or filter the sun's rays (Solar Radiation Management or SDR techniques) such as wide scale roof whitening, marine cloud spraying, installing vast mirrors both in the desert and in outer space to reflect the sun's harmful heating rays; and mimicking the effect of volcanic eruptions by injecting the lower stratosphere with sulphate aerosols, effectively turning the sky purple (The Royal Society, 2009). Although in their infancy, the report – chaired by esteemed British cosmologist Sir Martin Rees – has suggested such technologies are ultimately viable and provide humanity with a reasonable (indeed, by our very nature, perhaps our *only*) chance to maintain the conditions on Earth required for human survival. In support of these measures, a group that included three Nobel laureates made a presentation at the Copenhagen Climate Summit urging leaders of the world to get behind these initiatives (Copenhagen Consensus Centre, 2009). Speculatively, part of the inaction on mitigating climate change through reducing greenhouse gas emissions could be because of the potential to create industries and future profits out of geoengineering techniques that do this for us. In this context however, and to return to the themes of biotechnology's relationship to profit in earlier chapters, though geoengineering is very likely to occur in one form or another, the ongoing 'solutions' to managing the mean surface temperature of the Earth (and for that matter, any and all forms of future emergent 'biological' crisis) will, I argue, more likely come from synthetic biology or 'bioengineering'.

Craig Venter, founder of Celera Genomics, the company that famously first sequenced the human genome in 2000, is now digitising biology with the aim of designing and synthesising life. His projects include the development of fourth generation fuels that use carbon absorbed from the atmosphere as a feedstock (in the hope of replacing the petrochemical industry) as well as numerous other forms of what can be termed 'bioremediation'. Venter argues that to regenerate or create new life out of the digital universe:

> *is not Genesis ... this is building on three and a half billion years of evolution, creating a new version of the Cambrian Explosion where there's massive new speciation based on digital design ... Our only limit now is biological reality and our imagination* (Venter, 2008: online).

From bioengineering new organisms to bioengineering ourselves! Human beings in our current form are ill-equipped to coordinate the accelerating contingencies and uncertainties of a violently shifting set of biosphere conditions. It is more than likely we will need to adapt our very biological constitution with whatever means we have to accommodate the shifting biospheric coordinates that comprise us. By necessity we may have to engineer our molecular configurations, splicing our genes with any and all array of reconfigurative possibilities as a foundational 'biopolitical' risk management procedure. As cosmologist Sir Martin Rees has suggested, the humans of the future, if there are any, will be as unfamiliar to us today as we are to the bacteria from which we came (Rees, 2006). No longer the meek, nor the geek, in the future it will likely be the *freak* who will inherit the Earth. This argument, as radical as it sounds, is not isolated to individual human survival, for recreating a diverse range of interactive organisms, both plant and animal, is absolutely necessary to recreating the conditions for life.

It was through the rise of biodiversity – the vast interconnected webs of the Earth's ecologies – that there spontaneously emerged the conditions for complex life, including humans. Anthropogenically generated 'efficiency', the hand maiden of entropy, has led to the monoculturisation of the planet, both in terms of what species we have chosen to promote and the side effects of our activities that have led to the chronic rates of species extinction previously mentioned in this chapter. If we are at all to re-create similar conditions capable of supporting complex life (because they are impossible to restore), we need, as biological artist Eduardo Kac suggests, to "increase global biodiversity by inventing new life forms" (Kac, 1998: 1).

To explain this proposal in more precise detail I now turn to cybernetic information theory, previously mentioned in Chapter 2, as a way of illustrating how the cultivation of diversity, complexity and uncertainty are essential to negating the flows of entropy that are ubiquitous in our biospheric context.

The study of cybernetic information theory grew out of the research presented at the Post WWII Macy Conferences, in particular that of Norbert Weiner. His investigations into cybernetics deliver a key insight into the notion of uncertainty as a guiding principle with which to resist the terminal nature of entropy or noise in cybernetic information systems. N. Katherine Hayles frames the findings of Weiner's research, noting that for a system to fend off the encroachment of noise or entropic decay, it must be able to:

> *respond flexibly to changing situations, learning from the past, (and) freely adapting its behaviour to meet new circumstances, succeeding in preserving homeostatic stability in the midst of even radically altered environments. Nimbleness is an essential weapon in this struggle, for to repeat mindlessly and mechanically is to inevitably let noise (or entropy) win. Noise (entropy) has the best chance against rote repetition where it goes to work at once to introduce randomness. But a system that already behaves unpredictably is not so easily subverted. If a Gibbesian universe implies eventual information death, it also implies a universe in which the best shot for success lies in flexible behaviour* (Hayles, 1999: 78).

Difference, diversity, multiplicity, complexity, randomness and unpredictability are all fundamental to the negation of entropy, be it in machines, in humans, in ecosystems and indeed, the biosphere itself. Gregory Bateson in *Steps to an Ecology of Mind* (1972) and Michel Serres in *The Parasite* (2007), both make the observation that fending off noise (or entropy) is the source of all creativity. This bizarre but essential logic is the foundational theory I use to underpin the core claim made in this thesis – that our hopelessly entropic anthropogenic trajectories can only be derailed by an equal and opposite resurgence of diversity and difference tantamount to what Craig Venter describes above as "a new version of the Cambrian Explosion" (Venter, 2008: online). How best to do this is the core argument of this thesis and the principle theme of the chapters to follow.

Conclusion

It has not been my intention here to provide a detailed account of geoengineering, nor bioengineering, but rather to acknowledge their presence on the horizon of a future biopolitics of the biosphere that will more than likely need to resort to such unprecedented measures to ensure the continuation of conditions that will support human life. Given the stakes (outright ecological annihilation) and the collective failure of our institutional and bureaucratic bodies to make any meaningful change in light of them (or even appear to have the potential to do so), what I will endeavour to do now is examine what I call 'generative' ways of producing ongoing solutions to the biopolitical paradox of 'endless' growth within a finite and rapidly diminishing biospheric context. To do this I will necessarily need to explore alternative, experimental and 'indirect' ways of meaningfully engaging with this paradox that do not seek to *maintain* the fiction of the natural as the 'sustainability' discourse and industry does, but rather, seek to 'transform' it through strategies and techniques sourced from the fields of art and design. Of major significance to this inquiry is the way in which the focus upon catalysing transformational change moves away from seeking 'top down' institutional solutions to these problems, and instead shifts its focus toward individual empowerment and action as a way of enacting ongoing transformational change from the 'bottom up'. In line with the themes outlined earlier in this thesis, this pursuit concentrates its attentions on a review of the notion of the 'self', in particular appropriating the current biomedical (biopolitical) model of 'self care' and redirecting or "deflecting" (Fry, 2009a: 10) its trajectories instead toward something akin to the craft of selfhood practiced in ancient Greece known as the 'care of the self'. While not set up as operating exclusively against, or independent of, the top down institutional and bureaucratic approaches to these problems that are still *more than* required, instead this thesis chooses to flesh out how individuals may begin to inform and empower themselves in meaningful ways to act independently against biospheric entropy generation and species extinction. My hope is that these bottom up, generative approaches will ultimately complement (or be complemented by) top down strategies toward the same realisable goal: to counter the unsustainable trajectories of our species and reverse the terminal destiny to which they lead. Nevertheless, this argument chooses not to bank on the fact that institutional powers can or will do this, given their inertia to date.

I stress at this point that bottom up individual empowerment is not proposed as 'the' outright solution *per se*; rather, it is an avenue of inquiry and potential action that is grossly under-represented in popular 'sustainability' discourse. Furthermore, if the

tools of logic and rationality have delivered us to this fatal end, what then do we replace them with to begin to think of constructing a future another way? In the following chapters the notion of the individual self as 'artist' is of vital significance, both as an agent capable of making meaning (and change) outside the strict demarcations of deductive logic and rationality, and as a multiple-tasker capable of coordinating the many and complex scales of action required to construct a future.

Chapter 6: The Artist as Agent of Future Construction

'The Imaginarium' is devoted to the prescient subject of ecological change and the adaptations caused by artificial interventions into existing ecosystems. It catalogues a world in which the sun is setting on our idealistic and preservationist views of the natural world. The slow burn of evolutionary change, its endless generations, duplicating and multiplying with gradual mutation and variation is coming to an end. We now design the natural world as if it were the built landscapes of our cities ... we see this jump in the fossil record, an evolutionary leap, as the interbreeding of biology and technology gives birth to a strange new nature. Here we gaze out at the near future population of our augmented wilderness. We lie in wait, where the wild things are, as these early specimens breed and multiply, to generate the new cities of a day soon to come (Lucas Feireiss, Louis Berrios-Negron, 2010).

The critique that is implicit ... is a generative critique, where the act of undertaking a reappraisal or critique of a situation occurs within the act of generating or designing, something new. The self-critique occurs by not running from our fears, comforts and disfunctions, but by engaging with them in order to transform them; highlighting them while generating something compellingly poetic, useful and provocative in the same gesture. As part of their generatively critical agenda, they all blur waste with generative production, consumption with production, and danger with purity ... in moving us through these tangles ... we were tickled by the very thing we sought: transform-ability (Pia Ednie-Brown, 2009: 13).

In *Design Futuring: Sustainability, Ethics and New Practice* (2009a), Tony Fry outlines both his position regarding the state of the biosphere and his vision for the future of design, a discipline that he argues is at the frontline of "transformative action" (2009: 6). Given Fry's uncompromising declaration that "we are now at a point where it can no longer be assumed that we, *en masse*, have a future" (ibid.: 1), *Design Futuring* sets a clear agenda of the path that needs to be taken; that is, we only have a future if it is of our own making, and the mode by which that creation will take place is through design. Fry's pragmatism, direct and to the point, is emphatic of the consequences of anything less than a full blown commitment to communal action. As he states:

> *To name and face the situation ... is not 'doomsdaying' but realism. Problems cannot be solved unless they are confronted and if they are to be solved it will not be by chance but ... by design. We human beings must recognise that we are now on the cusp of one of the most dramatic changes in our mode of earthly habitation. Against this backdrop, 'design futuring' has to confront two tasks: slowing the rate of defuturing (because, as indicated, for us humans the problem adds up to the diminution of the finite time of our collective and total existence) and redirecting us towards far more sustainable modes of planetary habitation* (Fry, 2009a: 6).

The 'redirection' Fry speaks of is central to his approach, which involves "taking back the power of design and reorientating it" (2009a: 10) from within the contingencies of its present day to day operations. Fry identifies this practice as something akin to martial arts, whereby the act needs be "deflective rather than confrontational … it can take the energy from the existing momentum of a particular force and bring it to a means of change" (ibid.: 10-11). *Design Futuring* can only be done within the contingencies of the world as it is, transforming the unsustainable *on the run* so to

speak, hence his use of "futuring" as opposed to creating 'a future'. Creating 'a future' implies arriving at a static place, whereas "futuring" is a verb, a doing word that makes it not a concept, but a practice that is located firmly within the contingencies of the present, and, most importantly, is *ongoing*. Unlike other 'future' or 'futurist' manifestos, in Fry's futuring there is no revolution or revelatory moment, the displacement of the now in favour of an idealised utopia, for change has to happen within the context of life as it is lived in the defuturing condition that is the here and now. I use the term 'futuring' throughout the remainder of this thesis as the basis for understanding the project I am trying to initiate – that itself is dedicated to working within the contingencies of the present, *on the run* and ongoing.

Critical to the focus on the self that this thesis prioritises, Fry argues that "redirection requires an ontological shift in the mode of being of the actor. The value of what one knows and does may have to be fundamentally altered" (2009a: 11). This focus on individual agency as the key to catalysing a futuring condition can only come forth from what he suggests is the devising of a new kind of "design intelligence" (not to be confused with intelligent design) that should be "a mode of literacy acquired by every educated person" (ibid.: 12). As he suggests, to:

> *broaden the scope of what actually comes to be recognised as design means*
> *that who actually becomes recognised as a designer is itself extended ... artists*
> *design, plumbers design, farmers design, foresters design, gardeners design,*
> *bricklayers design, structural engineers design – and so on* (Fry, 2009a: viii).

Such a position de-privileges the cliché of design as an elitist, esoteric practice, and in turn locates its power in the operations of the everyday person. This democratisation of design opens up its potential as a locus of innovation and experimentation, thereby broadening the potential for an emergent "design intelligence" to collectively come forth. Such a position is integral to the arguments I am making in the following chapters of this thesis, in particular how this intelligence relates both to the individual self and the democratised access to design that the everyday individual has in domains it has traditionally otherwise been excluded from.

What informs and drives Fry's design theory is the possibility for an alternative to the hypocrisy of sustainability that he calls the "sustainment", defined as "a moment in time that unfolds as a continuous present" (2009a: 15). The sustainment temporally collapses the future into the present, a process that effectively seeks to continually create a futuring condition from the actions of the right here and now. Remembering that we only have a future if we create it, Fry's approach runs contrary to 'sustainability' in that it does not seek to maintain the present, but rather create the future from it as a necessary transformation. This potential is, however, not simply one of designing intelligently, for there is a political motive to Fry's work that is inextricable from the 'designerly' context that is his core focus. According to Fry, our ability to change is perhaps first and foremost dependent upon our ability to recognise our obsessive compulsion towards excessive consumption, not just the way we 'do' it:

> *Excess is so excessive that it escapes us in its omnipresence. We are enveloped*
> *by it: open your wardrobe; check out a local garage sale; wander into a*
> *department store and survey the obscene squandering of resources en route to*
> *landfill, so beautifully shelved, stacked, hung and draped around*
> *custom(er)ised space; take a walk through any new suburb and look at the*

size of the houses that almost totally fill their blocks. But then, and in contrast, there is the inequity that casts at least one and a half billion people into absolute poverty. Such people are unable to sustain themselves and the world around them – often, in their lack, the discarded excess of others is their lifeline (Fry, 2009b: 1).

Later in this chapter I explain how the care of the self, or *to* care for the self, as understood from the modes of selfhood practiced in ancient Greece, involves extending a proportionate level of care to others, both human (the rest of the human population) and non-human (predominantly the critical ecology upon which our lives are predicated). This is the core of what I believe are the necessary ethics that as part of an aesthetics or *artistry* are essential to overcoming, as an ongoing process, the critical state of the biosphere we as a species have created for ourselves. Our obsessive compulsive penchant for excess, as outlined by Fry, is gratified at the expense of others, both human and non-human, which severely limits the potential to collectively create a futuring condition. As Fry suggests, such a position of sustainable excess that we enjoy in the West "fails to grasp that global equity, and by implication social justice, is indivisible from sustainment, and that the 'enjoyment' of excess within any currently existing form of economy rests upon maintaining the lack and inequality of others" (2009b: 1). Such a generative critique is nothing new. Moves to create a greater degree of equality through 'fair trade' agreements have come a long way in recent times, however the systemic inequality produced by the West is not simply to do with 'how' we do things but 'why' we do them at all. In this capacity one of the most emphatic points Fry makes is that we need to "cut loose from [the] developmental capital logic of perpetual growth" (2009a: 185). How Fry proposes we do that is the subject of the second book is his Design Futuring Trilogy, *Design As Politics* (2011). I return to this in more detail shortly.

Architectural theorist Pia Ednie-Brown, while not claiming to have 'the' answer *per se*, proposes ways of working through these issues via what she describes as an "ethico-aesthetic" practice (Ednie-Brown, 2007). Contrary to the straightforward, often dry pragmatism of Fry, Ednie-Brown's approach is a more subtle and arguably seductive means of creating transformational change that is, by her own definition "hot, wet and hairy" (Ednie-Brown, 2010a). *Plastic Green: Designing for Environmental Transformation* (2009) catalogues the 'Biospatial Workshop', a research teaching project run by Ednie-Brown through the School of Architecture and Design at RMIT University in 2007-8. Her approach focuses specifically on the notion that 'green design' should be more about 'transformability' as opposed to 'sustainability': "The 'sustain' of sustainability implies the maintaining-of-things, or a keeping-things-going. Clearly, our systems and modus operandi are failing us and many other forms of life. Sustainability is unsustainable" (Ednie-Brown, 2009: 3). *Plastic Green* thus concerns itself with the breakdown of the boundaries between nature and artifice, asking that if the environment, and we with it, have been transformed, albeit destructively, then can that transformation be redirected and itself *transformed*? In this way Ednie-Brown seeks not necessarily 'direct' solutions, but more so malleable outcomes from existing patterns of behaviour. As she states:

We didn't so much focus on designing solutions to the problems, but rather on exploring properties of plasticity and transformability in the design of systems. In other words, our attention was oriented toward the plastic, and plasticity as a quality of relations (Ednie-Brown, 2009: 5).

Ednie-Brown's approach shares similarities to Fry's in that what she proposes is a redirection from within the contexts, momentums and trajectories of the world as it is. She frames this quite differently however, as a redirection primarily concerned with the redirection of habit:

> *In a climate of change, the plasticity that is implicit to all living beings becomes more explicit. In terms of the environmental crisis, we are already in the process of shifting from one set of habits to another. If our consumption habits seem hard to break, that is because they are already plastic: they don't break, they gradually yield, change shape, restructure. It's how best to remould those shapes which becomes the crucial issue – or, in other words, how to skilfully and critically develop our transformability* (Ednie-Brown, 2009: 5).

Ednie-Brown proposes a distinct and refreshing way of enacting this transformation through "creativity" and "play" (Ednie-Brown, 2010b), and/or "risk, care and laughter" (Ednie-Brown, 2009: 3). As opposed to the serious, direct pragmatism of Fry, Ednie-Brown entertains the idea that we might be able to address these issues in ways that are more aligned with our everyday preoccupations, namely aesthetics, but as she states, "By the 'aesthetic', I don't mean simply what something 'looks like', but rather a form of knowing that pertains to the experience of relation, or more colloquially, the way in which we feel relationships of all kinds" (ibid.: 3). Solutions that are either overly pragmatic or fundamentalist tend toward being either Spartan, eco-righteous or eco-fascist, none of which are enticing or attractive to Ednie-Brown. As Ednie-Brown suggests, "It's just not that much fun being 'good' for the sake of it" (ibid.: 4). Ednie-Brown's approach is more about accommodating the various forces, disciplines and dynamics at play that will attract transformational change on the basis that it "tickles" (ibid.: 13) the fancy to do so. This notion of 'tickling' is her way of inviting bodily relation into the aesthetic of being. If it is "just not that much fun being good for the sake of it", then perhaps enacting transformational change is more a case of doing because it *feels good* to do so. Projects from the Biospatial Workshop such as Boo Chapel's *Wearable Carbon Offset Scheme* (ibid.: 149), in which the user participant recycles their own emissions on the body in a calamitous way, to Stephen Mushin's *The Loop* (ibid.: 30), in which human faeces are traded for food credits enabling the depositor to reap the benefits of the food (re) produced by their own actions, are humorous yet very salient avenues of transformation by design. Tickling, while not altogether pleasurable, can be enjoyable, and does excite us into action, into the prospect of being tickled for the sake of it. Imbuing 'green' design with humour, irony and play thus makes it an unexpectedly enjoyable experience, and indirectly creates or invites the potential for new and inventive ways of acting ecologically. The fundamentalist 'nature' of eco-righteous, eco-fascist fanaticism arguably does more harm than good in this regard because it alienates people from wanting to be a part of transformational change, if that change is demanded didactically in Spartan, frugal and/or militarist terms.

Another critical approach in Ednie-Brown's work is that it seeks to facilitate the potential for fresh perspectives and approaches to spontaneously emerge, hence she champions "open loop dynamics" (2010b) for their receptivity to the novel and peculiar that are the most fertile means of creating 'emergent' potential. Emergence can be used to describe the way complex systems and patterns arise, cohere or emerge

out of a number of combined elements and interactions. It is used across a wide variety of disciplines and domains from philosophy to art and science to describe the way systems grow and evolve and/or die. One of the key elements of understanding emergent behaviour is that it is impossible to predict exactly what will happen, given that the combination of elements always produces an 'X' that is more than the sum of its parts. The aforementioned hypothesis of this thesis, that a convergence of forces (ageing populations, biotechnological potential, and governmental withdrawal of responsibility for these populations) produces what I call an 'immortalist biopolitics', is itself an example of emergence (in my case, speculative emergence) at play. Similarly Ednie-Brown suggests that the world is composed of "infinite strands of hairy connectedness" (2010b) that form together to produce an open loop dynamic that is more than the sum of its parts. In order to understand this potentially transformational logic it is first necessary to understand its opposite, namely the scientific deduction of not dynamics but "resources" to their "reckonable" – that is closed, not open – parts. Philosopher Patricia Glazebrook explains:

> *When Galileo said in The Assayer that nature is a book written in the language of mathematics, he established the foundational assumption of modern science: quantification is the a priori. Epistemologically, then, quantification is the sine qua non of knowledge. Ontologically, everything that is can be reckoned* (Glazebrook, 2010: 2).

Closed loop systems are made so by the 'reckonable' logic of rational deduction. The Earth is popularly perceived as a 'closed loop' ecological system (Summer Symposium on Sustainable Systems, 2010) because it does not rely on matter exchange with any part outside of the system. 'Open loop' systems instead concentrate on how properties form together to produce emergent outcomes, that is, become *more than the sum of their parts*. Our collective failure to address the critical state of the biosphere in its many and varied forms is the product of the way we perceive both the problem and the solution in closed loop 'reckonable' terms. To reiterate Glazebrook, it is this very perception that created the problem of an unsustainable defuturing in the first instance:

> *The scientific reduction of nature to reckonability ... constitute*[s] *not "development" in any meaningful sense, but rather a downward spiral of destruction ... deteriorating labour conditions, global scarcities, biodiversity loss, toxin generation, and greenhouse gas production. In short, consumer culture is engineering the next mass extinction. Humans who uncritically accept consumer culture as destiny are complicit in their own death* (Glazebrook, 2010: 2).

What is required therefore is first perceiving and then treating the biospheric context, the 'reckonable resource' at our 'disposal', as a system of open loop dynamics that cultivate the conditions for life precisely by recognising and in turn nurturing their interconnections, as opposed to quantifying them into inert and static 'components'.

Similar to Ednie-Brown's notion of infinite strands of hairy connectedness, Spurse, a peripatetic design and consultation service made up of transient artists, architects, geologists and philosophers (amongst others), operate along the lines of what they call "entanglements". These entanglements refer to the interwoven elements of the biosphere that do not exist in isolation but are interdependent and co-producing, that

is, create emergent outcomes precisely because of their interconnected relationship to one another. Spurse are interested not so much in what a 'thing' does in isolation, but how that thing interacts within the larger scheme of other 'things' and the ongoing effects these interconnections produce: "Things are what they are because of their relational network. The effect of a thing is relational. The relation is in itself a unique thing. This is a dynamic and emergent logic. We need to ask less what something 'is' and more what it can *do*" (Spurse, 2010: 2). Similar to Fry and Ednie-Brown, along with Morton (2007) and Gissen (2009), Spurse see their position in the interactive, re-directive state of transformational change as one of active agency in the role of "paradigm making" (2010: 1). The predominant question for Spurse in this regard is how to initiate a transformation within the context of the world as it is? Sharing similarities with Ednie-Brown's approach, they argue that this begins by making the move toward formulating new habits:

> *New ideas, concepts and paradigms are fine, but how do they get actualised? Consider the life of a habit. Before a habit is a habit, it is an emerging action that does not yet know its outcome. Our actions are habituated during stable states, becoming habits that we use to modulate the world. How a fishing net is made, how schools of fish migrate, how the sun is transformed by phytoplankton – these are habits. We need to work directly at the level of habit production* (Spurse, 2010: 2).

But habits, as Spurse suggest, always occur in context. As Samuel Beckett wrote, "Habit is the ballast that chains the dog to his vomit" (Beckett, 1931). In the context of global warming it is not so much carbon nor methane that are the culprits but rather our species' unyielding behaviour. Despite the common knowledge of impending 'catastrophic climate change', we as a collective appear to show no great urgency to ward off this inevitability, accustomed as we are to waiting for the catastrophe to happen *before* we do anything, or worse, displacing this responsibility as a legacy to future generations. As argued by famed US economist (and chief agent of global entropy generation *par excellence*) Milton Friedman: "Only a crisis – actual or perceived – produces real change" (Freidman, 2002: xiv). The problem with our anthropogenically produced biospheric woe is of course that at the pointy end of needing to change it may well be too late. According to Spurse, habit forming thus depends largely on the way we manage, incrementally, our interactions with the world as 'co-composers with reality':

> *We are co-composers with reality. Life/action is a question of composition. Co-composition – because we are never acting alone. We co-compose with the strangest of things – bacteria, ocean currents, pharmaceuticals circulating in the water supply, cell phones and fashion trends. This makes reality a question of aesthetics. It is an aesthetics of singularities, alliances, composings, apparatuses, and systems. There is an art to this that is not of, for or from the human alone ... How do we reshape our polis to welcome the arts of the masses?* (Spurse, 2010: 3).

The role of artistry here is vitally important, for clearly we need to become more art-erly or design-erly in our approaches to not 'solving' problems in concrete, rational, scientifically deductive 'conclusive' ways; rather, we need to learn to weave the multifarious and forever mutating factors not at our 'disposal' but at our *aid* in ways that have ongoing generative repercussions. As Fry reminds us, "designed things go

on designing" (2009a: 3), and not only that, for the design we send into the world will feedback differently as it engages with the 'X' of the world, thus we can never rest with a stable set of results, achieve homeostatic equilibrium, or in this sense, 'closure'. Rather, an inherent flexibility must be built into the 'things' we design (including ourselves) that must be capable of adapting and responding to the forever accelerating change that will inevitably arise. The way we actively combine elements of the world, and ourselves within them, requires the development of a more sophisticated aesthetic, acutely aware of the ongoing effects of our co-construction of the world that must (somehow?) be orientated toward a futuring condition.

In this context, the following arguments will review what I argue is the most important 'thing' to be designed: what we define as, and identify with, as the 'self'. This self must by necessity be re-imagined and re-engineered to be capable of perennially adapting and responding as an act of 'self-preservation', to the shifting coordinates that come to define it, indeed, that it is inextricably part of.

The Next Generative Step: The Self

The three generative approaches outlined thus far – the *Design Futuring* of Tony Fry, the ethico aesthetic practice and pedagogy of Pia Ednie-Brown, and the entangled complexity of world construction practiced by Spurse – resemble I argue an "arts of the masses" (Spurse, 2010: 1) in action, moving toward the emergent process that Ednie-Brown ambitiously suggests could "resonate together into one exponentially bigger, coordinated orchestra" (Ednie-Brown, 2009: 2). Born of the need to re-form habits, not by inhabiting any one set of monotonous criteria, but rather constantly questioning the practices and procedures that constitute our actions (and their ongoing consequences) and designs (the designed keeps on designing) in the world to create an ongoing futuring condition. To conflate these three approaches together they might look something like:

A re-directive practice within the context of the world 'as it is' that uses design intelligence to co-compose reality, producing not a culture of preservation or restoration of the natural but one of constant transformation between the operations of interactive systems, with a faith in the processes of emergence to stimulate and create life inducing properties; in other words an ongoing, futuring condition.

The one thing however that I argue is missing from this definition, and the one thing that the generative approaches presented thus far do not state explicitly enough, if at all, is the importance of the role of the individual in these processes. To reiterate, what this thesis is seeking to enact is not a generative possibility exercised exclusively through top down governmental, institutional or bureaucratic channels. Quite the contrary; the desire here is for these generative approaches to be embodied and practiced at the local level, independent of any formal, hierarchical, organisational structure. By independence ideally I mean the absolute furthest degree of independence possible, that being the site of individual agency. I say this for two reasons. First, given that large scale institutional change is at present neither swift nor agile enough to act in order to avert the worst of catastrophic climate change, I have chosen to concentrate on the individual self precisely because of its potential to be a swift and malleable agent of change both spatially (the body is readily accessible) and temporally (there is no faster mode of change than through individual choice).

Second, 'bottom up' individual change as opposed to 'top down' institutional change is preferred because as institutional arrangements have failed, and arguably will continue to fail, individual action, a largely unexplored mode of biopolitical action in this regard, is, I will argue, the most fertile means of cultivating an emergent, open loop dynamic. As emergent logic dictates, the degrees of emergence produced are proportionate to the number of differing elements, differing 'selves' that constitute that emergent condition. Amplifying to the *nth degree* the idiosyncrasy each and every one of us has, cultivating the diversity of creative potential each and every one of us can create, optimises and maximises the opportunity for an ongoing 'state of emergence'.

The culminating argument of this thesis is that the soundest way to negate and/or reverse anthropogenic entropy generation is via the 'deregulation' of the self. Deregulation affords the self the opportunity to act in the many and varied creative, idiosyncratic and differential ways required to enact, as a collective, an emergent 'futuring' condition that at present, individuals cannot, subsumed as they are by the constriction of institutional arrangements that inhibit their ability to do this.

To foreground this proposal I will now examine how such a self could come to fruition within the context and contingencies of 21st century biopolitics. I do this by returning to Michel Foucault's theory of governmentality as it is translated into contemporary genomic and biotechnology debates by social science researcher Stuart Murray. I will here demonstrate how molecular biopolitics, driven in large by the biomedical model of 'self care' outlined in Chapter 4, can be redirected to empower individuals by delivering them an authentic 'autonomy' that this model promises but does not actualise. This will take place by examining the way Murray critiques the foundational assumptions of the 'self' around which current biopolitical systems are organised and administered, creating the opportunity to rethink the autonomous self not as a process of 'self care', rather something more closely aligned with the 'care of the self' Foucault argues was practiced in ancient Greece (1986). Such a model of selfhood extends an ethics of care to relational 'others', both human (other selves) and non-human (the critical ecology of the biosphere) in which it is situated. The care of the self is central to the deregulated self hypothesis, for it both articulates how the self, in particular the 'ageing' self, can be empowered in the face of the encroaching era of biotechnological determination, and also how that empowerment, that caring of the self, can co-extend its 'caring self' to others selves and the biosphere in which they are all inextricably connected.

From 'Self Care' to the 'Care of the Self'

> *Whilst initially linking biopolitics to the regulatory endeavours of developing states (2003: 250) ... Foucault begins to develop his concept of "governmentality" to encompass the variety of ways of problematizing and acting on individual and collective conduct in the name of certain objectives which do not have the State as their origin or point of reference. And as he develops this line of thought, he distances himself from the view that such power over life is unambiguously nefarious. This is also the turning point that leads Foucault to a fascination with ancient modes of subjectification and the possibilities of freedom ... as the Greeks would have it, a flourishing life* (Rabinow and Rose, 2003: 7).

> *Bio-power originally described a set of "procedures" and "technologies" that aimed at controlling the body; but as Foucault discovered as he was examining the history of sexuality and the way Ancient thinkers in Athens and Rome would talk about the "care of the self," the same procedures could also be used to free the body, to teach it "how to live" better. Foucault sums up this type of "classical" and pre-Christian problem as the fundamental question: "which technē do I have to use in order to live as well as I ought to live?" (Rabinow, 1984: 348)* (Rabaté, 2003: 6).

> *I prefer to imagine the "care of the self" as a self-self relation that is inventive and open, as a self that questions the norms and constraints in and by which that self is said to be a self in the first place* (Murray, 2007: 9).

Stuart Murray's *Care of the Self: Biotechnology, Reproduction and the Good Life* (2007), understands contemporary biopolitics in very similar terms to those previously articulated by Nikolas Rose (2001). Murray argues that the nature of our self is increasingly defined by medical discourse, or the clinical 'gaze' as Foucault originally described it, the result of the increasing penetration of various technologies and their concomitant epistemologies 'into' the body. These ways of knowing focus on the molecular constitution of the self, the molecular biopolitics that for Rose are implicitly intertwined with the vested interests of the 'regimes' of power that produce them. Concurring with Rose, Murray argues that this development is central to the emergence of the medical paradigm of 'self care', the now dominant model of public health policy in neo-liberal nation states. As previously argued in Chapters 3 and 4, 'self care' is designed primarily to serve economic and entrepreneurial ends. Murray seeks to problematise the notion of the 'self' upon which these biopolitical discourses and policies are predicated, critiquing the quantitative dimensions of this definition that understand and utilise the self as a sum of codes, bits and bytes – essentially as 'information'. While this relationship of the self to medicine was beneficial in ancient times (he cites the Romans as both the genesis and original exploiter of the notion of an individuated self), today any such benefits are subsumed by a biomedicine heavily influenced by the advent of molecularisation. As he states:

> *I argue that human identity is fast becoming a matter of genomics, the identity of the self collapsed into its genetic identity. It is increasingly difficult to identify – even obliquely – an unalterable biological nature: biotechnology promises to intervene at the most intimate and elementary level of life itself. But more than discreetly organ-izing the body, biotechnology sets up the very vocabulary in and through which all manner of "life" will have social, cultural, and political significance, ultimately determining the kind of experience we can have of ourselves and of others as living beings whose lives have value. Consequently, our socio-organic relationship to ourselves and to others – and especially to our children – is undergoing a profound transformation* (Murray, 2007: 3).

The question Murray seeks to answer is how 'self formation' – and in turn, what it means to be 'human' – is created, and what this means for our relation not only to ourselves, but to others. Vital to these relations are the way biotechnological apparatuses, the "factory" as Rose describes them (2001: 15), initiate a process whereby human ontology becomes subsumed by scientific epistemology, a process where 'being' becomes subservient to the 'abstract theory' of being, one created by and for biotechnological ends. As Murray argues:

> *Biotechnology is a burgeoning field of research and practice, representing a vast industry spawned in part by the Human Genome Project, including the manifold interests of agribusiness, multinational pharmaceutical corporations, reproductive and therapeutic medicine, and even governmental agencies involved in all aspects of regulating human life, from insurance and public health policy to biological warfare and bioterrorism. Together, we might call this the "biotech apparatus," the background or life-world within which human relations unfold, are understood, and can be valued* (Murray, 2007: 3).

Critical to these developments is the biomedical model of 'self care' that is increasingly the dominant mode of both organisation and obligation in public health policy. The notion of self care is predicated on the assumption of a particular form of selfhood inherited from the tradition of liberal humanism, "the Enlightened, knowing self … conceived as the source of its own agency, autonomous, free, and guided by conceptual reason" (Murray, 2007: 3). As argued in Chapters 3 and 4, the model of self care is promoted on the basis of this autonomous freedom, however, as Waldby and Neilson (2005; 2006) previously suggested, such autonomy is one that largely has its freedom prescribed for it. What is really being empowered in this process is private enterprise as the compensatory mechanism which, at a profit, provides an alternative to state health provision in the form of 'anti-ageing' medicine. This extension of neo-liberal politics guarantees the future of economic growth (Waldby, 2000: 19) while embroiling the 'free and autonomous' self within the insurance mechanisms of the free market, in which they become obliged to participate *for their own good*. Critical of this process, Murray argues that this 'self' is itself a farce, an historical anachronism whose 'virtuous' attributes (freedom and autonomy) are nullified by the very technological and biopolitical processes that colonise 'freedom' and 'autonomy' into a prescribed set of possible actions. As he suggests:

> *Genomic technologies radically challenge our taken-for-granted notion of a rational, autonomous, and free subject. I therefore see the rhetoric of "self-care" as a response to this crisis – an anxious effort to reinstate a rational, autonomous, and liberal subject both in the name of liberal politics (e.g., through public health policy) and in the name of bioethics (represented by mainstream analytic philosophy)* (Murray, 2007: 4).

Generated by a "healthcare policy [that] endorses this model for ideological and economic reasons" (Murray, 2007: 1), self care is problematic on a number of levels, the most significant being that in practice it contradicts the very aims (freedom, autonomy) it intends to promote, instead complementing the interests of the entrepreneurial sector now granted the opportunity to fulfil the state's health care obligations according to the rule of profit. As Murray argues, "individuals are colonised by discursive models of selfhood and agency that are not, strictly speaking, their own. It is a form of hegemony" (ibid.: 7) where "[r]esponsibility is conceived in economic or entrepreneurial terms" (ibid.: 8).

As mentioned in previous chapters, the genetic and biotechnological dimensions of self care are no longer focused on the present so much as they are the 'likely' future, given our various genetic predispositions which can now be mapped, and to some extent predict the future of an individual's health. Therefore it is required of selfhood that it exercise pre-emptive judgement in order to avert the perceived 'risk' that it is,

making self care a process of pre-emptive risk management, "no longer dealing with a "real" medical crisis, but with a potential one" (Murray, 2007: 8). In this context the Foucauldian notion of the 'expert' can now be understood as a multi-faceted technological panopticon that penetrates the epidermal surface of the body to the point where an individual can no longer be identified as such, more an arrangement of molecules independent of a sovereign 'self', the supposed basis upon which such systems are predicated in the first instance. Murray argues that this self is in need of drastic revision if we are to avert the worst of biotechnology's conscriptive, reductive, quantitative agenda:

> *Freedom, in this model, is naïve: the freedom to choose, the freedom to exercise an "autonomy" that is defined with so much circularity – to have maximum choice, and to be free from norms and constraints when we make choices, all the while ignorant of those norms and constraints that inform our desires in the first place. Those who understand freedom in this model tend to see freedom in neo-liberal or "free market" terms: for them, our political freedom is no more than the quantity of choice in our marketplace* (Murray, 2007: 9).

Taking his cue from the research of Foucault into ancient modes of subject-hood, Murray proposes an alternative to the biomedical (biopolitical) model of 'self care' in the form of the 'care of the self' as it was practiced in ancient Greece. This understanding of 'care' is a practice toward oneself that occurs via the co-extension of the self to other individuals and, important for my purposes here, 'non-human' others, up to and including the biosphere. Here ethical considerations come to bear on notions of human political life, human dignity and most importantly, the 'common good', the original rubric upon which the enlightened liberal human subject was conceived.

Care of the Self

In Volumes 2 and 3 of *The History of Sexuality* Foucault (1984) describes human relations to medical technologies and how these changed from Greek to Roman times. According to Foucault this shift occurred in the opposing ways these two periods understood 'self hood'. For the ancient Greeks self hood was essentially a non-existent concept, yet for the Romans it was the very basis of their 'being' in the world. As Foucault describes it:

> *I think that one of the main evolutions in ancient culture has been that this technē tou biou became more and more a technē of the self"...*

> *"I think that the great changes which occurred between Greek society, Greek ethics, Greek morality, and how the Christians viewed themselves are not in the (moral) code (i.e., the prohibitions), but are in what I call the 'ethics,' which is the relation to oneself* (Foucault, 1984: 340, 372).

As Murray reiterates, the difference between these periods marks an historical disjuncture where the relationship to oneself and to others (including the world) became severed, rendering the ethical component of medicine not as something for the good life (being all of life), but for the good of 'I', de-coupled from that which gives it identity, meaning and 'being' in the first instance. Here Murray describes what the original, 'plural' self was:

For the Greeks there was no "problem of the self," properly speaking: it would be wrong to speak of a Greek "self" in the sense that we understand this term. Hence, medical practices in Ancient Greece did not constellate around individuated selves who would experience medicine as a "subjective" intervention in one's health or as a "technology of the self," as we do today. Instead, for the Greeks, medicine was one instantiation of the technē tou biou, a technē or "technology of life" – how to live and live well, how to live the good life (Murray, 2007: 5).

For the Romans however (and we as the inheritors of their practices), medicine came to be viewed not as a means toward an "ethical substance" (Murray, 2007: 5), for self hood was that substance, with medicine merely a tool or *technē* to achieve that self directed end. According to Murray during the time of the Romans medicine may have gone some way toward "freeing" the self by enabling a mastery over ones person; however, with the advent in modern times of molecular technologies this mastery over the self has been subverted by the *technē* itself, where in essence, the instrument became the master, where the tools we shape ended up shaping ourselves (McLuhan, 1964), a process Murray goes so far as to identify as "sinister" (Murray, 2007: 6):

Stated in the most polemical terms, modern medicine does not liberate the self – it enslaves it. Today, medicine has become part of the problem of the self, and this becomes even more obvious in our genomic era of medicine: who or what am I if I am first and foremost a genetic self; what ethico-political responsibilities do I have to myself, to others, and to my offspring within this paradigm; and what subjective agency is left to me if the sovereignty of the Kantian "I" is displaced from a rational, autonomous self onto a sovereign genetic code that has the first and last word on who I am, what I am, and on who and what I shall become? These are the new problems of the self in a genocentric age. Because genomic vocabularies have so pervaded the public sphere, it is impossible not to understand the self as a problem in these terms (Murray, 2007: 6).

Murray's proposition is that we need to abandon this inherited notion of the (Roman) self, and instead seek to reconfigure selfhood in alignment with what the Greeks understood as a process toward the "good life". The "good life" entails a political-ethical responsibility that displaces the ethical vacuum of the sovereign self as inherited from the Roman tradition. According to Murray, this newly conceived selfhood is "more commensurable both with recent theoretical views on subjectivity and – more pressingly – with the challenges of emergent biotechnologies" (2007: 1-2). The purpose of reinventing the self is to free it from the contradictory bind it is in where freedom, or what is superficially represented as such, is a masquerade or pastiche of its former 'self'. To re-think the notion of the self requires us to de-privilege the 'sovereign' aspect of selfhood and relinquish the imagined hierarchies that have been superseded by more dominant forces, those which are not below or other to the self but *relational*. This requires an 'archaeology' of ancient Greek thinking that revisits the relationship the people of that time and place had with both being (ontology) and knowledge (epistemology).

To begin to understand the Greek notion of the care of the self, Murray revisits the ancient dialogue between Socrates and Alcibiades which focuses on the question of how one comes to *know thyself*, the original epitaph written above the entrance to the Delphic Oracle. Here Socrates instructs Alcibiades in how to 'live well', which will

help him in his endeavour to learn how to 'govern well'. To do this, Socrates informs Alcibiades that knowledge in itself is not enough, for that knowledge, if not applied to the self, is wasted, reminiscent of Socrates saying in another context that *an unexamined life is not worth living*. As Murray translates:

> *How, Socrates asks, can we know ourselves? ... It is a question of how, rather than a question of what – a question of form over content, and this is already a shift in rhetorical registers. The self or soul is not a "what," it is not some thing among things, it is not some knowable content subject to technology. Instead, as we shall learn, the self or soul is itself the form that makes knowledge possible. The fascinating question here is: in what way – how – does the self know itself? How does it reflect upon itself? How does the self relate to itself? What are the forms of such a relation? Or what are the terms by which the self will relate to itself?* (Murray, 2007: 9).

Socrates informs Alcibiades that to know oneself he must *attend to himself*, and to do this requires he take *care of the self.* Remembering that in ancient Greece the sense of self is not at all similar to what we currently understand the self to be, Murray contends, "there is not yet a sense of the 'self' as we understand it; the self is not yet individuated, not yet a Cartesian, rational subject, not yet a source or origin of subjectivity" (Murray, 2007: 10). Critical to this formula for the self is that it is:

> *vital and relational, a political self whose self-relations and knowledge involve others originally: a self that is originally a relation. Knowing oneself, according to Socrates, is a relation of care, it is a spiritual practise, the form by which the self reflects upon itself* (Murray, 2007: 10).

In ancient Greece the notion of care is first, wholly dependent upon a relational context with other humans and the embodied context into which the self is embedded, 'nature'. Different from the modern sense of self that is a transcendent island, this self is wholly situated within that which gives it the very possibility to its own "knowing". Second, the notion of care as a "spiritual practice" begins with the relation of care the self has to itself, for knowing the self is primary, with the engagement with and interpretation of epistemological knowledge always ancillary to this. Contrary to the modern Western interpretation of the self that is created by an epistemology, which is *produced by* technologies of knowing, ancient Greek identity is always a product of a self that is unquantifiable in the epistemological sense. The ancient Greek self is in a sense animate, a "knowing" independent of any deductive, rational or abstracted knowledge, wholly subjective and contextual. It is from this subjective context that the relations to the world are produced, but this subjectification is at one and the same time produced by the context in which the self is embedded, a knowing that is relational via a recursivity between the knower and the known, in the modern sense, a feedback loop, the eye's seeing what is being seen (as explained by Socrates to Alcibiades), or what is more recently explained as the "chiasmus" by Maurice Merleau-Ponty (2003). According to Murray, in this self to other relation:

> *we can see that care is a relation that is directed both within and without. It is an ethical relation because it has everything to do with one's ethos, with the way one lives one's life and conducts oneself with respect to oneself, to others, and to the world in general. It is about the good life, not the good self* (Murray, 2007: 11).

The "good life" in this sense of the self is *all* of life, the good of other selves and the world around, not just the good or what is good for the transcendent island of 'I' that is informed and thus constructed by an abstract, epistemological knowledge severed from any relational 'outside' context. And what is absolutely vital to this relational context of what is "good" is the ability to remain open to what the "good life" is, free to explore and augment the "self knowledge" that comes with experience and with changing circumstance. It is not a static foreclosure that once arrived at stays solid and eternal forever, but rather is mutable, shiftable and transient, kept vital by its perpetual proximity to the essence of "knowing thyself", which is a to *know thyself* that changes, is adaptable, indeed that has to be in order to pursue the "good life". Murray connects this sentiment with another term more familiar in our own discourses of care today, *therapy*:

> *And it is worth noting that later in the Greek tradition, epimeleia is often substituted with the word therapeuein, which is the root of our own word "therapy." So, we are right to read a therapeutic relation here, or even a nascent bioethics. It is the kind of relation typical of a living being who is always in flux, temporally, and whose relations can always be improved, and whose knowledge can always be expanded* (Murray, 2007: 11).

This sense of openness, of a refusal to foreclose on 'what' knowledge and therefore being is, remaining always and forever a 'how' that is in constant flux and thus open, flexible and therefore creative, produces a constantly questioning 'who' that is, according to the ancient Greeks, Foucault and now Murray, the key to the "good life". The modern Western rational way of approaching the self as a singular, sovereign 'eternal' construct, something molecular technologies entrench via the revelation of it as an eternal truth or essence through a process of reduction and abstraction, deny this self the capacity for openness and thus the good life. Saying that, these technologies are part of ourselves and the way we are embedded in the world to which we are relational. Murray reiterates this inevitability, albeit conditionally:

> *To be clear, "care of the self" should be seen as a social and political project that does not condemn new genomic technologies out of hand; instead, it would be a critical project that returns us to the question of the self and the question of care in the pursuit of the good life. In other words, it would vitalise the questioning relation that the self has with itself, and it will look beyond, to question the kinds of subjects that emergent biotechnologies will inaugurate* (Murray, 2007: 18).

Paramount to these re-interpretations are the questions concerning 'teleology', or more precisely, an 'anti-teleology' that operates counter intuitively to any prescribed destination that biotechnologies threaten to designate for us. The refusal to be instructed on the specifics of what it is that defines, navigates and essentialises the future of human experience, is the real virtue in self knowing via a self - self relation that is constantly questioning, always mobile and (as Heraclitus reminds us) never ever the same. Foucault himself took inspiration from this Greek call to the good life when he articulated, in a wholly different context, "do not ask me who I am, and do not ask me to remain the same" (Foucault, 2000: 1). Thus the notion of *the care of the self*, as opposed to the dominant biopolitical paradigm of *self care*, requires understanding the qualitative over quantitative dimensions of the self that privilege ontological 'exploration' (fluid process) over epistemological 'knowing' (static

object). Critical to understanding and in turn engaging with the biologically hyperbolised future and the new ways of being we will by necessity come to practice, this ethical focus serves to imbue flexibility and creativity as a choice of freedom, yet also entails a concomitant ethical responsibility. Thus it is important to reiterate that the question concerning technology is not one of outright denying the self technological enablement or enhancement as a form of Luddite fundamentalism. Quite the contrary, the question this thesis poses is whether such technologies can be used as open ended, anti-teleological, self sustaining devices? As Murray contends:

> *Thus I tend to agree with Heidegger and others who have argued that the real threat of such technologies lies not in the physical destruction of humanity, but in what we might call its spiritual or rhetorical dimension, an openness that is too easily closed when we intervene in our elementary particles to manipulate human physical and psychic features. Thus, the real horror is not that something will go wrong with these technologies, but that they will work too well. To cite Žižek, the danger is, "precisely, that nothing will go wrong, that genetic manipulations will function smoothly – at this point, the circle will in a way be closed and the specific openness that characterises being-human will be abolished"* (Žižek, 2005: 17) (Murray, 2007: 18).

Immortalist biopolitics, born of the urgency to devise swift and salient solutions to the 'problem' of ageing populations, *is* the literal embodiment of this threat to the human "spiritual" or "rhetorical" dimension. The need to reconfigure this 'autonomous' self in ways that empower individuals to act in their own best interests within these overarching, subsuming determinations of emerging molecular biotechnologies, is paramount. Furthermore, in the context of the necessity to produce a biopolitics of the biosphere, that 'empowered' self has to also now, by necessity, extend the inward looking 'self care' to an outward consideration of what sustains that self, in lieu of the greatest social, political, economic and more importantly, environmental crisis the species has yet to confront (Lovelock, 2009). Thus the inalienable fact of human existence that is the desire and will to perpetuate life at whatever the cost (and to whoever the cost may be carried, re: future generations), effectively nullifies the debate as to the "good life" and the good self. As outlined by Murray, the potential to supplant the biopolitically generated notion of 'self care' with 'the care of the self' is paramount to re-imagining and re-engineering, to *redirecting* our relationships throughout ourselves, others, and the embodied context into which we are situated. To optimise and maximise the lives of populations, biopolitical policy has to be committed to do the same, though clearly this is far from realisation. Which begs the question, how to do this?

The purpose of this thesis is to explore paths, plans and perspectives with which to address the two contradictory, yet inextricably connected, biopolitical phenomena - immortalist biopolitics and the biopolitics of the biosphere. A large part of this practice, as this chapter has gone to pains to address, is learning what these paths are not. I will now conclude the chapter with a critique of one of the most recent and respected proposals toward 'solution', foregrounding my own contribution to this debate that stands in direct opposition to it.

Conclusion: A Critique of *Design as Politics*

Tony Fry's second book in his sustainment trilogy, *Design as Politics* (2011), attempts to figure ways through the inertia, complexity and seeming impossibility of the unsustainable that plagues our species. As the title suggests, Fry is using this book as a means to deliver the "crucial need for a new political imaginary" (2011: 32):

> *The actual organisational means to engage problems of defuturing with some chance of success will have to come from a broader and more informed understanding of causality and a sense of relational complexity. Such means need to have the ability to undermine biopolitical and technologically inscribed networks of* power (Fry, 2011: 32).

Similar to Murray, Fry seeks to create transformative change through a historical revision of what constitutes the human, for any transformative action "has to speak the desire for a future, the needs of the present and to the recovery of those lessons from the past [that are] able to provide the basis for contemporary solutions" (2011: 112). To apply that learning, Fry then argues that such changes must and can *only* happen as a political process working from the top down:

> *The vital directional changes that Sustainment demands cannot happen so long as it is overarched by liberal democracies that uphold economies predicated upon the dogma of continual growth and structural accommodation of inequity, technocentricism and the instrumentalization of culture ... The state of Sustainment has to become sovereign (thus the locus of ultimate power) so that politics, the economy and culture are subordinated to the meta-objective of making time – and thus act to reverse the defuturing trajectory of structural unsustainability as it diminished the finite time of our being. So framed, Sustainment becomes empowered – as an over determinate law of the state that imposes Sustainment as the primary responsibility of all over which the state exercises power ... Sustainment's victory is the only way humanity has a future* (Fry, 2011: 169-170).

Furthermore, Fry argues that as "technologically hyper extended beings" we not only mobilise technology as a defuturing force, but that *we* have been mobilised (subsumed) by the technology at our 'disposal': "Increasingly, we humans do not simply extend ourselves and our will via technology but technology now extends itself through us – we think it serves us but more and more we serve it" (ibid.: 56). While I agree with Fry to a point (he concurs with Schmidt, Heidegger and Baudrillard) that technology has domesticated and sublimated the human into a position of subservience, to outright refute the significance of the role that technology *must* play if we are to have any hope of constructing a future is unforgivable. To outright deny the role of technology; when it is too late to mitigate the effects of climate change; where a growing world population hungry for food, energy and 'development' in an age of chronic resource depletion, demands highly sophisticated solutions; where altering our biological constitution molecularly might be the only way we can survive, makes Fry's admonition against technology a reactionary Luddism. While I agree with Fry's historical position regarding the extension of technology into the body and the struggle for agency this has produced, I do not agree that this is the case if we inspect the way certain recent cultural emergences (the Arab spring and Occupy movements for example), predicated as they are on technological

advancement, have appeared. Contrary to Fry, I argue that now and increasingly so in the near future, the construction and application of high end technological innovation won't exclusively be a top down institutional process but increasingly the domain of bottom up 'deregulated' individuals empowered by the ever emerging, Do It Yourself (DIY) open source nature that emerging technological practice both produces and invites. In this capacity I choose not to demonise technology by imbuing it with a sinister animation, a *Ghost in the Machine* (Koestler, 1967) as Fry does. On the contrary I endorse and champion technology as a powerful and fundamental tool essential to the project of future construction.

Another issue is that, given Fry's 2009 book, *Design Futuring*, claims it is through redirection, not through severance, that his desire to instantiate a condition of "sustainment" is envisioned (2009a: 10), it seems grossly contradictory to demand as he does in *Design as Politics*, "a clean break with the Enlightenment tradition" (2011: 245), referring to the abandonment of the three dominant organisational paradigms of the 21st century; neo-liberalism, biopolitics and science and technology. The question I am seeking instead to answer here is: *Can these existing structures and momentums be retrofitted, realigned and redirected from within to make them both cognisant and capable of confronting the momentous challenges faced in the 21st century*? Fry's suggestion that it is necessary to impose as a form of top down hierarchical institutionalisation a "dictatorship of the imperative sustainment" (2011: 78), is similarly not only extremely counter to the positive trajectories and momentums of the present, but impossible without resorting to an idealised form of Marxist global governance that recent modern history suggests is an exercise doomed to fail. I take the opposing view:

Can the seemingly impossible-to-stop momentums of global entropy generation born of the reign of liberal (now neo-liberal) individualism, extended and amplified through the bodies of the global population by the omnipotence of industrial science and technology, and further hyperbolised by the charter of contemporary (immortalist) biopolitics, now be redirected to contradict their historical legacies and work toward instead the construction of an ongoing futuring condition?

I will here argue that neo-liberal individualism, biopolitics and science and technology, the three dominant organisational paradigms of the 21st century (and the core drivers of terminal entropy generation), are not be eliminated or 'broke' with, but *redirected*. Ironically, I argue that to do this requires the extension and amplification of their internal logics to the *nth degree*, in particular the deregulation of individuals via what I term the 'deregulation of the self'. As evidenced by the growing momentum of individuals empowered by the '2.0' user driven information technology revolution and the advent of the 'open source' 'Do It Yourself' (DIY) movement enabled through such technological platforms, I argue that such emergences from the bottom up are where genuine transformational potential resides, particularly at the site where information technology and biotechnology meet.

Individuated selves have as an act of contemporary biopolitics become increasingly more self-reliant and capable of performing self governance, as evidenced by the arguments of Chapters 3 and 4. My argument for the further deregulation of these individuals is an acknowledgement of cultural processes already in train, and a call for a further release from the biopolitical institutionalisation of bodies that inhibit their

ability to act independently, what I argue is the passage to responsible, transformative, 'future constructive' action. Institutional bodies subordinate the self to an infantile dependency on these structures that are, as outlined in Chapters 3 and 4, more about maintaining the hegemony of the structures themselves than they are about the welfare of the biopolitical citizens that inhabit them. The deregulation of the self takes the power back from these overarching structures that by extension, inherently demand the individual extend a proportionate degree of responsibility or 'care' for their actions to both others and the biosphere in which they are inextricably interconnected. Contrary to Fry who argues:

> *Neither learning to care for what must be cared for, nor withdrawing from forms of living and acting that defuture, can occur 'naturally'. Both require designed and managed interventions to enable the creation of a sustaining 'naturalized artificiality' and the imposition of unfreedoms to curb the destruction of what 'sustains'. Such change heralds a huge politico-ethical meta-project that centres on establishing a 'common good'* (Fry, 2011: 146).

I believe 'care' can be generated without the oxymoronic top down exertion of force implied here on the basis that genuine 'care' is only ever that if it is 'sincere', that is, not mediated and manipulated by the sleight of hand of bureaucratic dogma (Watson, 2003). Chapters 7, 8 and 9, offer an impression of how this may come about through *deregulation*.

One way transformation can happen is through the onset of catastrophic circumstance. As earlier suggested by Milton Friedman, "Only a crisis – actual or perceived – produces real change" (2002: xiv). Under this assumption, if we simply adhere to the status quo and watch the imminent events of catastrophic climate change unfold, such a crisis becomes manifest. However, given the consequences of inaction, the crisis we speak of may be too profound (and too late) for any reactionary "real change" to make any *real* difference. My preferred choice of action, unprecedented according to Freidman's observation, is to adopt the biopolitical compulsion toward pre-emptive 'risk management' and avert the worst of catastrophic climate change through the generation of a culture of transformation *indirectly* via self learning, facilitated through processes of deregulation. Though I respect Fry's commitment to solving these problems, transformation means transforming the very means by which we think of transformation in the first instance. To seek transformative change using outdated, archaic and draconian models of top down hierarchical control that as modern history reveals have consistently failed, is oxymoronic to the logic of 'change'. To further deny the role that technology must play in this necessary transformation is not only irresponsible but suicidal, given the scale of the challenges ahead and the need for exosomatic capabilities that extend human (futuring) intent in compound, necessarily exponential ways. My approach, though unprecedented, speculative and highly uncertain, is itself a transformation that begins with the recognition that we need to transform the way we *intend* to transform. This necessarily entails the augmentation of individual freedom that I argue concomitantly invites the freedom to be responsible, not just to do the 'right' thing but to act in ways that have ongoing and generative futuring results. To do this, however, demands each and every deregulated individual employ a sophisticated mode of self artistry in order to produce the diversity, complexity and ingenuity required to collectively construct an emergent future. The deregulation of selves is, I argue, the key to enacting such a culture of transformation. Contrary to Fry, I suggest that what is needed at this point is not a

didactic, overly instructive, totalitarian 'dictatorship' of sustainment, rather a heuristic map or guide that facilitates a neutrality and an open endedness particular to each and every individual, an anti-teleological and anti-deterministic exploration of creating this self *without end*.

In the following chapter I will state the case that the experimental artistic practice of artists-cum-architects Arakawa and Gins provides a salient model for this proposed transformation. Though Arakawa and Gins' work does not specifically consider or address the biopolitical paradox outlined herein, the way I intend to apply their work *indirectly* is of significant benefit, I argue, to the art/science hybrid that is required for future construction to begin to take place.

Chapter 7: The Reversible Destiny Project

The increasing violence and destruction in the world – physical, ecological, economic, social and emotional – is all a product of our present modes of thought. If the cruelty is to end, our concepts must change. Since our concepts are physically encoded in the brain and grounded in the body, our brains and bodies must change. If art is to play a role for the good, it must disrupt our concepts, our normal ways of functioning – our brains and our bodies … Moreover art as disruption on a large enough scale will be sufficient to reverse our destiny (George Lakoff, 1997: 120).

Since the world is not merely given but is constructed by the activity of the subject, the recoding of the I is the recreation of the world (Madeline Gins, 1994: 251).

Calling their project 'reversible destiny', Arakawa and Gins disrupt the taken for granted teleological assumptions of our species' current condition via a thoroughgoing architectural renovation of our intellectual and somatic frontiers. Arakawa and Gins declare anything possible between the body and the architecture that produces it, arguing that architecture should be "unstinting" in its service or its slavery to the body (2002: xi). Through their collaboration, which has produced a series of artworks, installations, poetry, textual manifestos and architectural sites spanning 47 years, Arakawa and Gins' provocations challenge the expectation of the 'finite', as it is constructed and understood through the prisms of Cartesian, Euclidian and Aristotelian logics, teleological discourses that drive human endeavor toward particular 'ends'. In short, Arakawa and Gins remove the end, which forces us to ask the question, 'what happens then'?

Reversible destiny has generated significant interest and support from a wide variety of academic domains and disciplines, including but not limited to: art, architecture, cognitive science, psychology, linguistics, medicine, evolutionary biology and physics to name but a few. Three international conferences and multiple journals, articles and theses about Arakawa and Gins have been written with many leading international scholars using their work to pry apart, inform and procedurally engage with their own specific disciplines. At the *3rd International Arakawa and Gins Architecture and Philosophy Conference Online* (AG3) (2010), my video introduction to the poetry and poetics stream summarised the introduction to one of their key texts *Architectural Body* (2002) for the purposes of giving a lay audience a snapshot of what their project aims to do. Here is the written transcript of that video:

Who or what are we as this species? Puzzle creatures to ourselves, we are visitations of inexplicability. What is in fact the case? We must surely go to all possible lengths to find out what we exist in regard to. I want to find out, and so do I, what is indeed the case for those who sniff around this planet as us. We, the members of this species, have thus far failed to come up with a set of explanatory statements that could be universally countenanced as the definitive figuring out of ourselves (Gins and Arakawa, 2002: xii) *… Without doubt, the human race has hideously acquiesced in regard to its own abysmal fate. Underlying all cultures, East and West alike, is this assumption or attitudinal stance: we, each and every one of us, must die ... So unquestionably mortal are we that we have even come to call ourselves mortals, for God's sake … We contend that the whole crowd has it all wrong* (ibid.: xiv) *… It*

> *must never be forgotten that we don't know what we are in the first place*
> (ibid.: xvi). *Reversible destiny ... is as an open challenge to our species to*
> *reinvent itself and to desist from foreclosing on any possibility, even those our*
> *contemporaries judge to be impossible* (ibid.: xviii) *... If you say no, or yes, to*
> *this automatically, who are you, then, and where does it get you?* (ibid.: xx)
> *... Economic priority should be given to the resolving of existential puzzles:*
> *What is this species in the first place? What lives and what dies? It is*
> *admittedly costly for our species to ask questions of itself through architecture*
> *... But if this is how and from where the answers can come at last, why worry*
> *over the expense?* (ibid.: xxi-xxii).

Arakawa and Gins' disdain for the status quo, the 'defeatism' they describe as
inherent to anything that accepts mortality as the inescapable end of the 'human'
condition, is unique in that they do not merely 'deconstruct' our historical legacies, as
so many postmodern projects do, but offer a means to *reconstruct* them literally,
through architecture. This reconstruction is doubly unique for, unlike many other
utopian projects that seek to designate in explicit terms what the parameters of those
projects are, Arakawa and Gins instead keep their outcomes *non* outcomes, that is,
open ended or 'tentative', fluid and flexible enough to change in response to the
shifting coordinates or 'landing sites' that shape their situation from moment to
moment *indefinitely*. They are utopian only in the sense that they do not define what
utopia is, other than a commitment to the exploration of what we are as a species
without end. Arakawa and Gins' only specific request is that we decide "not to die"
(1997).

Though their work has not been applied specifically to the context I am seeking to
address in this thesis, my argument is that their prescience, evident from their pre-
emption of developments in a wide variety of domains (Rosenberg, 2010), extends to
a salience in addressing the biopolitical paradox outlined herein. Using both their
architectural and heuristic 'procedures', I will argue here that Arakawa and Gins'
innovative methods invite us to question the relationship of ourselves to ourselves, to
others, and to our 'environmental' surrounds in ways that are resonant with the 'care
of the self' approach articulated in the previous chapter. They contribute significantly
to the generative approaches to design futuring outlined thus far by offering a
heuristic map or guide necessary to facilitate the successful transition of the
(deregulated) self toward (a futuring) transformation. This chapter will illustrate how,
in reference to the quote by George Lakoff above, an artistic project such as Arakawa
and Gins can disrupt things on a large enough scale to reverse destiny (Lakoff, 1997:
120).

The most accessible entry point to their wide ranging and complex oeuvre is, I
believe, through the striking complementarity between their work and the relatively
recent discoveries in the discipline of cognitive science, popularly understood as the
'embodied mind' hypothesis. Once this explanatory foundation is established, I will
then illustrate, using Gins and Arakawa's key text *Architectural Body* (2002), the
path, process or 'procedures' through which they argue a reversible destiny can be
enacted. Of particular importance to the themes of this thesis will be the heuristic
dimension of Arakawa and Gins' work that functions as a self learning guide for what
they call the 'organism person', that I indirectly appropriate for the purposes of
creating a futuring transformation as the 'deregulated self'.

Cognitive Hypothesis in the Reversible Destiny of Arakawa and Gins

In the introduction to *The Embodied Mind* (1991), the seminal text detailing revolutionary findings in the discipline of cognitive science, its authors Francisco Varela, Evan Thompson and Eleanor Rosch declare:

> *This book begins and ends with the conviction that the new sciences need to enlarge their horizon to encompass both lived human experience and the possibilities for transformation inherent in human experience. Ordinary, everyday experience, on the other hand, must enlarge its horizon to benefit from the insights and analysis that are distinctly wrought by the sciences of the mind …*

They continue …

> *Our view is that the current style of investigation* [between science and experience] *is limited and unsatisfactory, both theoretically and empirically, because there remains no direct, hands on approach to experience with which to complement science … Our concern is to open a space of possibility in which the circulation between cognitive science and human experience can be fully appreciated and to foster the transformative possibilities of human experience in a scientific culture* (Varela, Thompson and Rosch, 1991: xvi-iii).

As a continuation of the work of the French philosopher Maurice Merleau-Ponty, Varela, Thompson and Rosch call for the need to understand emergent cognitive properties via the circularity or recursivity between our inner, physical, biological bodies, and the experiential, outer, phenomenological body that intersects with the world. However, as Merleau-Ponty originally pointed out, science and philosophy address experience always in a manner that is after the fact, being theoretical disciplines that engage with experience as reflection. The challenge therefore is to address this circularity from within lived experience as it occurs.

To further complicate the call from Varela, Thompson and Rosch, given that contemporary understandings of cognition are the result of bottom up spontaneously emergent properties, the transformative potential within this hypothesis must be engaged by not only mind, but by the embodied sensorium that produces it. This definition by necessity must also encompass realms that extend beyond the epidermal surface of the body. In this respect it can be stated that the environmental surround is as much a part of cognition as is the brain and the body, and its inclusion is integral to the success of any project investigating emergent cognitive properties. Therefore, to access the "transformative" potential inherent within this circularity or recursivity between science and experience, what is required is the creation of a practice that offers the opportunity to examine (and ideally experiment upon) the entrenchment of cognition within an embodied, cultural context as it happens in the immediacy of lived, moment to moment experience.

This foundational understanding in cognitive science is realised in the work of Arakawa and Gins, who's three dimensional 'immersive' architectural surrounds afford the discipline of cognitive science the opportunity to explore the transformative possibilities contained within the emergent cognitive hypothesis. The architecture of

Arakawa and Gins not only provides a space through which science and experience can mutually enlarge their horizons (before the fact as architecture precedes experience), for they also enable the possibility for a procedural architecture to be detailed in such a way so as to directly intersect, and to various degrees manipulate this circularity or recursive loop between science and experience; between the cognised body and the architecture that produces it. Indeed, the architecture of Arakawa and Gins should be understood as a vital if not indispensable procedural tool through which the transformative potential claimed by Varela, Thompson and Rosch can be made manifest.

On the cover of their 2002 publication *Architectural Body*, they offer an explanation as to why they chose this hybrid as their title: "We wanted it because it signaled the connection between what we do, and work being done in the fields of self organisation, autopoiesis, artificial life, and consciousness studies" (2002 – cover). As stated inside:

> *The Architectural Body Hypothesis/Sited Awareness Hypothesis puts forward the idea that embodied mind, a current way of referring to mind or awareness so as to give body its due, extends out beyond the body proper into the architectural surround; the surrounding bioscleave needs to be weighed in as part of awareness's body. This hypothesis would have us never forget that we are babies of bioscleave and are therefore only comprehensible (to ourselves) in terms of it* (Gins and Arakawa, 2002: 51).

In many ways Arakawa and Gins' work prefigures the recent developments in cognitive science (Rosenberg, 2010) through their artworks, installations, textual manifestoes and more recently, architectural surrounds. *Architectural Body* (2002) insists that the necessarily cognitive nature of biological processes can be engaged and transformed by constructing an architecture that forces the cognised body to pay exceedingly close attention to the way it encounters the world. The practice of observing the way the cognised body couples with, or to use the Arakawa and Gins terminology, 'cleaves' to its surrounds, affords the observer the opportunity to address the circularity between it and the world that produces it. It is here, in this in-between space or *entredeux* between reflection and experience, that the charged potentiality of emergent cognitive properties can be made manifest.

These strong thematic resonances between the architecture of Arakawa and Gins and the emergent findings in the discipline of cognitive science become clearer via an exploration of the way one of their key architectural constructions, the *Yoro Site of Reversible Destiny*, works. However, in order to understand how their architecture intersects and facilitates emergent cognitive potential I will first explore some of Arakawa and Gins earlier explorations as they were articulated through the medium of painting, and in turn how such lines of enquiry that began in two dimensions came to inform their present trajectories that encompass three dimensions, and ambitiously attempt to engage the fourth dimension, *time*.

Arakawa's early paintings (1961-73) (many of which were produced with Gins though she took no authorial credit for them) represent what appear to be semi finished sketches that sometimes look like technical drawings against backgrounds of white and varying shades of brown. The purpose of these two dimensional representations is to signify 'blankness' as a "neutral positing" (Arakawa and Gins,

1997: 36), in the sense that blank is a 'holding open' of the compulsion toward the standard artistic practice of conceptual and cognitive colonisation toward a predetermined end. As they state: "it is what is there but undifferentiated, so it is nothing … It is what fills emptiness" (ibid.: 36). Another way of understanding blank is through the French *blanc*, meaning white, which is of course the congealment of all the colors in the spectrum (as opposed to black, the absence of color). In this sense, blank (or *blanc*) is overabundance, the reservoir of potentiality from which anything can come forth. The concept of blank draws our attention to the multiple points of interpretation contained within open endedness, as opposed to the definitive teleological fixity much (not all) creative practice strives for and is habitually accustomed to. The visual argument in these artworks is that painting as an activity abstracts from nature, narrowing down and essentialising experience. Abstract thought is the frame that apprehends the open endedness of meaning, defining and positioning a text in exclusive, unequivocal terms. In this respect much of Arakawa's early work remains untitled (acting as the actual title of the work), which itself is an act of resistance to the etymological determinism that comes with labels that posit in explicit terms what it is we are meant to understand and experience from artistic productions.

Arakawa's paintings function as possibilities for reconstruction, involving "not so much the play of sensibilities as they do the experience of reflection" (Adcock, 2003: 204). In this way Arakawa (and Gins) want to problematise how we "speak and enquire about what we hold as knowledge, especially visual knowledge" (ibid.: 207). The blankness that is produced in these works is not so much about nothing or non-sense, as it is about the 'charged potentiality' that becomes apparent when our intentions of the way we read texts are questioned, confused and disorientated. A central key to Arakawa's work, (and the subsequent architectural productions that operate along similar lines), is the frustration of the expectation of predetermination in the consumption of texts, which forces into play a series of openings between the text and our cognition of it. In this sense blank operates as a middle way or entredeaux, an opening of the circular loop between experience and reflection. Crucially, Arakawa (and Gins) paintings do not so much conflate painting and experience, or operate in the gap between them, as respond to their dynamic reciprocity.

As a device for short-circuiting cognitive and conceptual processes, Arakawa (and Gins) use of blankness is the platform from which the possibility for cognitive and conceptual liberation is launched. But as you may have noted in this last sentence, these two dimensional representations are specific to a liberation predicated on visual experience alone. Though Arakawa (and Gins) larger canvases do engage the body to a degree (some experience a feeling of vertigo standing before the larger canvasses), it is from this need to concentrate on the body, to target its receptive centers in their entirety (as the 'bottom up' spontaneously emergent cognitive hypothesis, the theory that transformative cognitive potential is accessed by targeting the body's sensorium in its entirety, dictates), that the two dimensional artist and his poetic partner turn to architecture.

By translating these principles from two to three dimensions, Arakawa and Gins' theoretical trajectory works toward a more comprehensive engagement of the cognised body within a tactile, tangibly embedded, 'sensorially' charged space. In this sense, architecture that is what they call 'tactically posed' architecture challenges,

interrogates, frustrates and disrupts the predetermined, habitual, sedentary practices of modern living, destabilising and de-habituating the teleologically driven end points that govern it. Given this challenge, it can be said that Arakawa and Gins' goal has moved beyond blankness, for procedural architecture involves an active reconstituting of these cognitive and conceptual processes in a more life affirming direction, to a direct manifestation of what they call "crisis ethics" (2002: xviii) that ambitiously involves all of human civilization. It is through the notion of "crisis ethics" that Arakawa and Gins introduce us to reversible destiny, the central aim of their endeavors. "Crisis Ethics" is Arakawa and Gins' response to the mortal defeatism (ibid.: xii) they argue plagues our species, and is the definitive claim they make in regards to the transformative potential of the cognised body within a tactically posed architectural surround. Arakawa and Gins argue that the transformative potential for cognitive and conceptual liberation may indeed entail the possibility that through such architectural procedures we may not need to die!

To illustrate this point architecturally a good place to start is to consider what is actually wrong with normative architectural practice. It is argued by several theorists (Bergson, Poincaré, Rosenberg), that human cognitive freedom became lost with the imposition of a Newtonian grid of time and space onto experience (Rosenberg, 2003: 174). This occurred with the appearance of technologies of clock time and calculus utilised by governments to regulate and control human and social behavior. Such a condition extends to the domain of architecture, in particular contemporary architecture, which Arakawa and Gins argue ignores much of its primary function, to be first and foremost at the service of the body. Contemporary architecture is "insufficiently procedural" (2002: 54), that is, it is 'comfort' architecture that presupposes identity and fails to ask much of the body (the embodied mind). Still laden with the latent architectural heritage of buildings as monuments or mausoleums, as 'tombs for the dead', much of popular contemporary architecture abstracts, and thus detracts, from the open-ended potential claimed in the embodied mind hypothesis, once again narrowing down and essentialising experience. Philosopher Joel Robinson makes a poignant observation of contemporary architectural practice in this regard:

> *Investing spaces with architectural procedures for asking how we constitute ourselves in the world, Arakawa and Gins' architecture aims to empower us to stretch the limits of sensorial plasticity. Their work thus stands in opposition to smart homes that, as second skins that are becoming increasingly self-regulating and interactive, make their user inhabitants proportionately dumber. It also stands in contrast to those coffins (as Gibson calls them in Neuromancer) that numb the senses to everyday dwelling, and against the celebration of virtual architectures and obsolescent bodies ... theirs is a tool for reconfiguring ... reforming ... and reengineering* (Robinson, 2005: 38).

The smart home, through the satiation of pleasure and comfort, through solving every dimension of experience to create a problem-less mode of living, kneads and coaxes the user inhabitant into a numbed state, an architecture that Jean Baudrillard in a different context (consumer society) calls an environment of "seduction" and sedation that domesticates and sublimates its user inhabitants into becoming just another object for consumption (1988). In this way, standard architectural practice is not dissimilar to the model of "learned helplessness" as it is understood in behavioral psychology

(Seligman, 1975). Arakawa and Gins' surrounds work as the antithesis to this kind of architectural logic. Through the deployment of procedural tools that confuse, disorientate and question the body's relationship to its surrounds, their spaces produce effects that are tentative and highly uncertain, inducing a sense of open ended possibility which works to resist all compulsions toward habit, routine, acceptance, inevitability, and any other kind of corporeal or conceptual predetermination.

The Yoro *Site of Reversible Destiny Park* in Japan is perhaps the most significant of Arakawa and Gins works in this respect. Nothing if not science fictional in the way it rearranges elements and icons of the world, one of the key purposes in the design of the park is to induce a sense of danger with respect to balance. The question of balance in relation to embodied cognition is apparent in the way that a tentatively anticipated free fall, induced by the elliptical fields of the site, becomes the central concern of all proprioceptive and kinesthetic motor activity, as these systems become alert and highly tentative, 'at the ready' for the abrupt and random changes in terrain and perspective the body experiences in incremental degrees as it moves through the site. Rosenberg describes the experience as follows:

> *The sheer difficulty of negotiating the terrain may serve to reorient and reconfigure the mind's relationship with the body at a moment when the body must feel its way through an environment with so few dependable visual cues as to render a person blind ... One can barely edge from one moment to another, reconfiguring one's relationship to the terrain only as fast as the reorientated mind can process ... When one is inside the elliptical field, one cannot resort to a bird's eye perspective that could help track prospective hurdles and hazards. Only the will to experience vertigo can enable a visitor to continue, to test the capacity of the body (from below) to process unthinkingly through* (Rosenberg, 2003: 173-4).

What we can see from this brief excursion into Yoro is the way the architecture is tactically posed so as to deliberately question and challenge the body's relationship to its surrounds. Though Yoro is perhaps the most extreme example of the discombobulating nature of Arakawa and Gins' architectural work, the same principles are nonetheless inherent within all of their architectural productions that extend from the construction of houses, lofts and apartments, to the proposed reversible destiny hotel and draft potential for construction of an entire reversible destiny city. The underlying theme resonant among all these sites is the endeavor to disrupt the sedentary practices common to the cultural economy of contemporary architecture. To inhabit these spaces is to enact an ongoing bodily movement leading to direct health promotion with respect to the body's circulatory, endocrine and muscular systems. The focus on balance specifically (and the danger of losing it) is a key tool used in the stimulation of proprioceptive and kinesthetic functions in the body. In this sense the architecture operates as a proprioceptive, kinesthetic antagonist, targeting and thereby interrogating these under-utilised if not dormant cognitive properties for the purpose of *transformation*.

With experience embedded in a context that is no longer understood through the past tense of reflection but the present tense of the 'immediate', the circularity or recursivity between reflection and experience in an Arakawa and Gins architectural environment becomes more readily cognised and in turn accelerated, even exponentialised! Drawing on metaphorical descriptions of the way the architecture

can bring a greater intimacy between humans and their environment, Arakawa and Gins employ the example of the snail to illustrate the way architecture can increase its proximity to the body, so that to wear it is like dressing oneself in a second, third, fourth and counting skin. A more accessible way of understanding the nature of this intimate structural coupling between an organism and its environment, is through Andy Clarke's description of the fluid dynamics of certain fish. In his book *Being There: Putting Brain, Body and World Together Again* (1998), Clarke uses the 'Tale of the Tuna' to describe the way select fish appear to defy the laws of physics in their capacity for propulsion and maneuverability. The argument begins with the illogic that dolphins are simply not strong enough to propel themselves at the speeds to which they do. According to the Triantafyllou brothers the extraordinary swimming efficiency of certain fishes is due to an "evolved capacity to exploit and create additional forces of kinetic energy in the watery environment. Such fishes, it seems, exploit aquatic swirls, eddies, vortices and pressure gradients, in turn using them to support speedy and agile behavior" (1998: 112).

Here the organism in question has such a sophisticated evolutionary intimacy with the environment that produces it that its capacity for swimming defies the 'laws' of its perceived biomechanical limitation. This talent is predicated on its tentative 'at the ready' monitoring and massaging of the fluid dynamics at any given point in time, that changes with each distribution of time and space in accordance with every new set of parameters that define its situation. Responding to minute changes as they happen, summoning all it can in the cognising of each specific point in time without the encumbering 'guidance' of teleologically determined end points (the abstracted 'human' goals of reflection severed from experience), is what Arakawa and Gins are suggesting we do via the construction of architectural procedures tailored specifically to such biomechanical 'law' defying possibilities inherent within the dormant cognitive potentials of the body.

This raises the essential point to be made with respect to the heuristic trajectory of Arakawa and Gins and the foundational assumptions of the discipline of cognitive science. In the opening lines of *Architectural Body*, Gins and Arakawa state the need to recognise ourselves (and the species from which we emanate) as "puzzle creatures":

> *Who or what are we as this species? Puzzle creatures to ourselves, we are visitations of inexplicability … We must surely go to all possible lengths to find out what we exist in regard to* (Gins and Arakawa, 2002: xii).

Contrary to the common practice of solving in concrete terms this ontological mystery, Arakawa and Gins do not seek to redress this with the positing of an abstract scheme or knowledge with which to overcome and 'know' it; rather, it is the very uncertainty of our being that Arakawa and Gins embrace as the definitive guiding principle for an architecture that must avoid stasis and the teleological determinisms that encumber it, if it is to engage experience as it happens and yield the dynamic cognitive potential contained therein. Resonant with the findings of cybernetic information theory, principally the research of Norbert Weiner illustrated in Chapters 1 and 4, Arakawa and Gins' architectural procedures, predicated as they are on the notion that the species is a "puzzle creature" to itself, recasts their vision for the species from this contradictory 'platform' of uncertainty. For cognitive science

practitioners, Arakawa and Gins' architectural and heuristic practice is thus vital if not indispensable to the ability to renegotiate and recast cognitive bodies toward the transformative potentials contained within the emergent cognitive hypothesis.

Situating Arakawa and Gins' work within the context of the emergent findings in the discipline of cognitive science highlights the malleable nature of the cognitive body (formerly the concrete, eternal, rational 'I') and the means by which our evolutionary impulses can be accessed, augmented, perhaps even accelerated. The arguments I will be making here however suggest that such potentials, as important as they are as a means of species transformation, have to be accessed independent of the explicit architectural context, given the chronic rates of resource depletion and rapid global warming that limit both material and time resources with which to make transformative change. The 'procedure' required to understand this remarkable possibility is to re-examine their 2002 book *Architectural Body*, mindful (embodiedmindful) of what reversible destiny might really mean in context of the challenges to be faced in the 21st century. Here I will make the argument that it is not the architectural but the heuristic dimension of Arakawa and Gins' work that is of vital significance to this 21st century context, in terms of how it comes to inform both the 'generative' approaches outlined in Chapter 6, and the deregulated self hypothesis to be articulated in Chapter 8.

Redirecting *Architectural Body*

Organism that Persons

Gins and Arakawa argue that the historical construction of the human as the singular subjective sovereign 'I' inhibits the body's ability to explore and know its self. As they state: "Terms such as *ego*, *consciousness* and *psyche*, losing the body as they do, lack those air passages through which the body draws in atmospheric wherewithal" (2002: 2). Gins and Arakawa's re-naming endeavor serves to pry apart the narrow conception of the historically embedded human by labeling its operative basis an unfinished product:

> We have adopted the admittedly clumsy term "organism that persons" because it portrays persons as being intermittent and transitory outcomes rather than honest-to-goodness entities" (Gins and Arakawa, 2002: 2).

By preceding 'person' with 'organism', Gins and Arakawa de-privilege the cultural construction of the 'I' that has subsumed the organism from which it came; that is, they posit the cognitive body as a biological entity prior to the cultural construction of it as a person, the abstract, fixed, teleological (and terminal) subject that seeks to *know* in reductive, conclusive and unequivocal terms, above all else, what that person 'is'. As they state:

> Insensitive to its own immediate needs, to the nature of itself as the central problem, our species – mostly represented by those who speak the loudest for the longest – is so unboundedly proud of having built the cart that it permanently and in an ongoing fit of mad harnessing, features it before the horse. The horse: the animate. The cart: culture, be it modern or postmodern (Gins and Arakawa, 2002: xvii).

The organism that persons is one of Arakawa and Gins many and varied neologistic naming tendencies or 'terminological junctions' (itself a neologism that is an example of what it represents) that reconstruct language for the purpose of yielding something else from it. If reality is contingent upon the language we use to bring it into being, where "fact is the past tense of the fiction that creates it" (Haraway, 1998: 69), reworking language indeed remakes the world. Arakawa and Gins understand that the language we use can become too "habitual", what Jondi Keane identifies in their work as one of the three "monorails of homeostasis" (2006: 161) that along with "agency" and "groundedness", colonise and constrain conceptual and corporeal (cognitive) possibility. Terminological junctions such as the organism that persons disrupt the taken for granted phrases, "the words of the tribe" (Lecercle, 2006: 11) by hybridising, twisting, counter-posing and joining contradictory terms to agitate the pre-determined, colonising tendency of language toward reiterative, reductive ends. It is precisely through such destabilisations that Arakawa and Gins re-program the category of not only the person, but also the world, thereby opening up the possibility for it to become an undesignated 'X'. Importantly, they do not in any way indicate what this 'X' is. They allow 'X' to emerge by taking a course that doesn't 'arrive' anywhere, nor produce quantifiable 'outcomes' or meet key performance 'indicators' – the *Death Sentence* (2003) of 'management speak'. What Arakawa and Gins seek to do via the reconstruction of language is produce a new kind of subjectivity, possibly a multiplicity, whose ontological being is generated, first and foremost, in its linguistic interaction with (giving and receiving) the world. How Arakawa and Gins propose to orientate, steer or guide that newfound subjectivity/multiplicity as an anti-teleological, open ended process toward an undesignated 'X', is through a similar reworking of the components, steps or moments of ontological experience they interpret epistemologically as "landing sites".

Landing Sites

Landing sites are used by Gins and Arakawa to describe the way attention operates and to simultaneously map the way these attentions come to know themselves and situate the body, albeit tentatively, within an environment. The production of landing site configurations enables organisms that person (the subject under construction) the ability to be mindful of the way awareness is distributed in order to: "gain perspective on human functioning and separate out its component factors ... kinesthetically, tactilely, visually, orally, olfactorily, and gustatorily all at once" (2002: 13). Landing sites operate on three levels or scales that are singular to themselves yet also overlap simultaneously, slipping seamlessly into and out of each another. These are "perceptual", "imaging" and "dimensionalising" landing sites.

Gins and Arakawa state that a perceptual landing site: "lands narrowly as an immediate and direct response to a probable existent, a bit of reporting on what presents itself" (2002: 7). Perceptual landing sites are what grab attention in the immediate; the object in front of you, the text on a page, the nearness of anything that is so proximate as to be right there in the here and now. Conversely, an imaging landing site "lands widely and in an un pin pointing way, dancing attendance on the perceptual landing site, responding indirectly and diffusedly to whatever the latter leaves unprocessed" (2002: 8). Imaging landing sites can be thought of as the next stage away from the perceptual, what's happening later in the day, what's going on just around the corner, what you can feel but can't see, the not quite here and now but

getting there as the pre-cursor to the perceptual. A dimensionalising landing site is quite different from the imaging and perceptual landing sites, as it loosens and widens its cast of attention to draw in the bigger picture so to speak, even if the elements thereof are imperceptible in form and substance:

> *A dimensionalising landing site registers location and position relative to the body. Building, assessing, and reading volume and dimension, dimensionalising landing sites "engineer" depth and effect the siting of environment* (Gins and Arakawa, 2002: 21).

The dimensionalising category of landing sites is of most importance to my purposes here, for it most accurately describes the way we come to engage with the looming specter of chronic overpopulation, resource depletion, global warming and species extinction. Dimensionalising describes how we can relate to these events and, given the consequences of not doing anything about them, understand the co-extensive nature of our actions as they are instantiated in the here and now. Dimensionalising landing sites articulate the broader context within which organism persons are situated as temporally extended beings with a past – but more importantly a future – that urgently needs to be re-constructed ideologically, etymologically and architecturally. In this sense, what is important to all three landing site configurations are not only the ways in which we land on them but in turn, once landed, the way upon which we *launch* from them. Here, a landing site becomes correspondingly a 'launching pad', and given the tentativeness that is the hallmark of Arakawa and Gins' work, make the two – landing and launching – a synonymous activity. You can never rest for too long on a landing site, nor relax from the tentative state that put you there in the first instance, meaning that a landing site is a place for fleeting re-assessment before the next move or 'leap'.

Gins and Arakawa use landing site configurations as the basis for the construction of their tactically-posed architectural surrounds. Yet landing sites also operate independently of having to have a tailor-made, tactically-posed architectural surround to bring them into being. They are indeed everywhere, constituting the everyday lived contingencies of our most rudimentary and basic operations. As Gins and Arakawa suggest, independent of a tactically posed architecture to bring them into being, "A landing-site configuration can, then, be thought of as a heuristic device with which to leaf through the universe, never mind that is unpaginated" (2002: 9).

Important to Gins and Arakawa's concept of landing sites are the way they describe a "Neutral Zone of Emphasis" (2002: 22), which describes how 'tentativeness' is primary to the negation of teleological fixity:

> *A neutral stance asks that non-resolvable issues be kept on hold – fluidity and flexibility on hold – right out there in the world where they occur; it asks as well that they be held open and made to open still further to yield additional information about what is at issue* (Gins and Arakawa, 2002: 22).

For Arakawa and Gins it is integral that the organism that persons is constantly at the ready to shift, mutate and/or reconfigure to the changing coordinates of the environmental surround to which it is subject. In an Arakawa and Gins tactically-posed environment, the active, forever at the ready body, cannot help but be such as it is subjected to a series of kinesthetic, tactile, visual, oral, olfactory, and gustatorial

cues embedded in the walls, floors and ceiling. Contrary to this, what I am seeking to explore is how landing sites operate as a heuristic device for understanding the world *as it is*. It is through the heuristic instruction of landing site awareness that we are delivered the ability to be cognisant in a variety of ways of the 'what', 'why' and 'how' we do what we do – and this is the first step in shifting the habits through which we, conversely, 'tactically engage' our built environment. The best place to begin to understand how this can happen is through an examination of what constitutes 'architectural surround'.

Architectural Surround

As stated, Gins and Arakawa's foray into architecture has been their means of accessing the transformational potentials of the emergent cognitive hypothesis. First, however, we have to recognize the limitations imposed upon the cognitive body by the status quo, reinforced by an architecture whose historical legacy comes from a culture building 'monuments' or 'tombs' for the dead: "Let our species cease being stunned into silence and passivity, into defeatism, by a formal architecture that seems so accomplished but that leads nowhere" (2002: 39). The architecture that Gins and Arakawa build calls forth from the organism that persons all that it is capable of. They build questions into their architecture that consider the wider context into which the organism that persons is situated. As they ask:

> *In what respects and how variegatedly do physical surroundings invite bodily action? How far out into the environment does an organism that persons extend? To what extent do surroundings influence thoughts and actions?* (Gins and Arakawa, 2002: 40).

These questions force user participants to confront the relationship between themselves and both their immediate surrounds *and*, specific to my purposes here, the environment that extends beyond the walls to include the biosphere, or as they neologise it, 'bioscleave'. In this sense, their architectural practice can direct or even "redirect" (Fry, 2009) questions and inquisitions orientated toward particular areas of focus. Beyond the role of questioning, however, these surrounds concomitantly invite action:

> *Preexisting those who enter them, architectural surrounds stand as elaborately structured pretexts for action ... Organisms that person need to construct their hypotheses and enter them, surrounding themselves with ordered presentations of their suppositions. Our claim: architecture can help a person figure herself out* (Gins and Arakawa, 2002: 41-44).

In an Arakawa and Gins architectural surround, though questions are posed, considerations mandated and actions invited, the prescribed answers or 'outcomes' normally associated with such learning experiences are missing. Here Gins and Arakawa are preoccupied with setting up the conditions for an unknown transformation, for an undesignated 'X' to emerge. Though they are fond of positioning 'not dying' as a worthy limit (itself etymologically defying a limit), they do this by positing the world and everything in it, beginning with the self, as "a tentative constructing toward a holding in place":

> *Everything begins for these organisms with a tentative constructing toward a holding in place. The environmental communal, which has everything to do with how an organism persons, can, when reworked in a concerted manner, lead to a person being able to supersede themselves* (Gins and Arakawa, 2002: 47).

As stated, Gins and Arakawa are adamant that "enormous sums of money be spent on constructing the world as a tactically posed surrounding for the benefit of the body" (2002: xix), which presumably would also include labour and material resources. Given the constraints imposed upon these best intentions by the converging crises of overpopulation, resource depletion, global warming and species extinction, I return now to the question of how else might the transformational potentials claimed in the architectural body hypothesis be enacted, and in a way that does not demand vast sums of money, resources, and what the species is most running out of – *time* – to produce it. Could it be that everything we need, *tentatively*, is already here, and that transforming ourselves within it is merely a case of re-interpreting or 'reading' the surrounds differently, in a way that "procedurally" re-invents the organism that persons as it moves through a biotopology (Arakawa and Gins, 2006) of pre-existing landing sites?

Procedural Architecture

Arakawa and Gins neologise "bioscleave" to describe 'biosphere', primarily because it overcomes, through the notion of cleaving, the nature/artifice distinction that is an historical legacy of "procedural knowing". Unlike biosphere, which 'describes' the mere 'zone' of life, bioscleave is a verb, an active doing word suggestive of something in motion, the dynamism inherent in the act of reciprocity, where to cleave is to be cleaved to, and so on. Cleaving in this sense suggests that biosphere is palpable, graspable and malleable, co-constructable like Escher's hands drawing, where the organism that persons *is* an act of reciprocation with its environment; one producing the other as a mutually integrated, operative dynamic whole. As Gins and Arakawa state, bioscleave further denotes the co-extensive nature of this cleaving:

> *Embodied mind, a current way of referring to mind or awareness so as to give body its due, extends out beyond the body proper into the architectural surround; the surrounding bioscleave needs to be weighed in as part of awareness's body. This hypothesis would have us never forget that we are babies of bioscleave and are therefore only comprehensible (to ourselves) in terms of it* (Gins and Arakawa, 2002: 51).

Gins and Arakawa's term "procedural knowing" (2002: 52) describes how the historical legacies that comprise the status quo are maintained. Like the models of 'learned helplessness' in the discipline of psychology, procedural knowing is wrought in the habitual momentum of tradition forged by a psychology where: "Nobody wants to be caught not getting the 'real' straight" (Gins and Arakawa, 2002: xiv). Thus the status quo further entrenches itself, institutes itself (De Certeau, 1986: 32) as the sole agent of the real, imposing artificially abstracted limitations on organisms that person. Arakawa and Gins use procedural architecture to undo the autonomous process of repeating or reiterating procedural knowing by forcing the organism that persons to examine the operations and processes of life as a tentative, moment by moment sequence that, when understood as such, can be procedurally re-worked.

According to Gins and Arakawa, the world as it is, and why it fails us in the form of our own mortality, is due to what they identify as "procedurally insufficient biocleave" (2002: 95); that is, a world that has not had the necessary procedures inserted into it to orientate our own lives toward an openly ongoing end. However, there are limitations to this formula. Arakawa and Gins have not stipulated anywhere near enough the extent of the reciprocity implicit in their idea of 'procedural sufficiency'. For, though we may aspire to sustain ourselves indefinitely using biocleave, first and foremost we surely need to identify our own lack of procedural awareness for learning to sustain what it is that sustains us? It is at this point that I deviate from Gins and Arakawa's core trajectories, for although I share their call for a "crisis ethics" (2002: xviii), I baulk at the obsessive preoccupation with overcoming individual mortality, displacing this instead with the more pressing concern of the species mortality as a whole as the 'outcome' or teleology of procedural knowing and doing. If the ongoing solution to death, be it of the individual or of the species, is through the re-proceduring of biocleave, then that has to happen first by derailing procedural knowing. Arakawa and Gins believe that the best course of action is to build architectural environments that communities of people can live in and learn from. The question I instead seek, is whether such a disruption can occur *independent* of the wide scale building of tactically-posed, architectural surrounds? I believe it can, partially, through the construction not of architecture, but the language that precedes it. As Jean-Jacques Lecercle (2006) explains:

> It is clear that language is a red thread in Arakawa and Gins philosophy ... the word is the predecessor of the architectural procedure, tactically posed surrounds are phrases and sentences, their sequences propositions, (are) complete with logical connectives, or "three-dimensional THEREFOREs, BUTs, Ors, ANDs and built-up WHATEVERS" (Lecercle, 2006: 15).

The architectural body is a built discourse, first and foremost a philosophy based upon the construction of language that brings it into being. For Arakawa and Gins, it is the body's proximity to architecture that is the site of transformational change-making, yet all architecture is the built discourse or the material manifestation of the language that pre-cedes it. This being the case, cannot language too become a primary site of intervention, where words and the world meet? Madeline Gins suggests that reading a text is not merely an intellectual exercise of the mind, but a co-extensive, embodied process (1994: 12). In this context, is there not a way in which Arakawa and Gins' reversible destiny project can be read, thought and communicated into existence, apportioned out into the world from the thought that brings it into being? Gins and Arakawa argue that the architectural body is not a practice to be undertaken in isolation, rather it is a community-wide collaborative initiative (2002: 61) with which to tie the frayed and loose threads of the species together, constituting not a noose (in the sense of other utopian projects, such as Marx and Nietzsche's philosophy) but an open ended rope (Byrd, 2010). Ironically, paradoxically, this communal devising is at one and the same time a freedom to explore the endless idiosyncrasy of the self:

> What is preventing us from inventing ourselves further? The answer comes quickly; the species has not yet learned how to have its members pull together at the same time as they continue to form themselves as separate individuals (Gins and Arakawa, 2002: xi).

The architectural body of Arakawa and Gins can only be enacted as a community-wide project, if forged on the basis that it permits a freedom for its constituent members to explore organism personing independent of – or 'deregulated' from – other organisms that person. Here the shared common ground, the binding rope of the communal is 'freedom'. To float a hypothesis here: If the architectural surround is composed of 'free' individuals that inhabit it, can it be said then that individuals ourselves are as much a part of the environmental surround as the built, exosomatic environment itself? If architecture can change to effectively change the way organisms that person live, then by that logic so too can organisms that person *as architecture*, change to affect the way the environmental surround is experienced as an 'embodied', 'sensorially charged' space? I believe we can, by beginning with the way Arakawa and Gins reinvent language. Citing Lecercle again:

> *But this intricate relation between the reversible destiny project and language goes further. Reinventing language means actually doing violence to it in order to renew it; it means not only inventing a new language (for which this might be simply a new architectural or philosophical jargon) but eventing language* (Lecercle, 2006: 15).

Browsing Arakawa and Gins book titles provides a stark reminder of their penchant for linguistic violence: *Reversible Destiny: We Have Decided Not to Die* (1997), *Making Dying Illegal* (2006), *Alive Forever Not If but When* (2011). Here titles stand for "events" (Lecercle, 2006) that forge into the moment of the everyday the possibility of contemplating the impossible, which has the effect of rupturing but for an instant (albeit in a state of shock, horror, and/or outrage and ridicule) our taken for granted assumption of the 'is'. Such violence to established, habitual, "procedurally known" linguistic protocol opens a space of contemplation, if only momentarily, that forces a reconsideration of what our beliefs or expectations are and/or possibly could be.

At the first international conference dedicated to Arakawa and Gins' work I made the suggestion that the reversible destiny project should concern itself with "inviting the architectural body into everyday lived experience" (Hughes, 2005). However, to reinterpret that ambition as partially achievable through the liquid operations of the language with which we communicate everyday makes this a less intimidating and more approachable task. The information revolution of the late 20th century signaled a shift in the way language and communication can become powerfully viral, amplifying the capacity of "memes" (Dawkins, 1976) to take hold and mutate in their own abstract version of natural selection. In the 21st century these information networks are growing, complexifying and accelerating exponentially, to the point where they are converging digitally with biology, making life itself a construct of genetic code or molecular 'information' (Rose, 2001). The concept of 'coordinology' invented by Arakawa and Gins, I argue is essential to aid in the engagement with these forever complexifying, aleatory elements of our architectural surround.

Coordinology

Arakawa and Gins use coordinology as the linking process to skillfully address the way the cognitive body holds several things 'on the go' at once. Like a juggling technique, coordinology holds multiple scales of attention simultaneously, enabling a

perspective from which to translate information and meaning analogously across many attentions, actions, practices and 'disciplinary' domains. Gins and Arakawa define it as: "Not a series of actions taken on this scale of action or that but the coordinating of several scales of action makes a person able to construct a world" (2002: 63). The transformative potential of the architectural body/embodied mind hypothesis begins with the ability to practice world construction. However, to return to the core question of this paper, can this be done without actually physically 'constructing' something, such as a labor − and resource − intensive work of architecture in which to do so? Consider this:

> *Until a significant number of tactically posed surrounds are in use, the architectural body we hypothesize to exist cannot but make itself scarce. It will be hard to come by except as a heuristic device. Architectural bodies do exist outright in surroundings that are not tactically posed* (Gins and Arakawa, 2002: 64).

Hard to come by does not mean outright impossible, and in the spirit of the agents of the impossible that Arakawa and Gins are I propose that, given the mandate to construct a future from a position of limited resource, to "do a lot more with a lot less" (P. Christoff, personal communication, July 17, 2009), a heuristic device such as the art of coordinology is the method by which 'more with less' can be done. Coordinology mediates the relationship between the cognitive body and the world, and as a heuristic device can help facilitate the reciprocity between the two as a co-constructive, emergent process. Gins and Arakawa understand this reciprocity as such:

> *We speak of an architectural body, rather than an architectural field or an architectural context simply because, to begin with, what we want to describe originates from and joins up with the physical body. Think of the body proper as lending some of its body to the architectural surround, which, in turn, lends some of what characterizes it as architectural to the body proper* (Gins and Arakawa, 2002: 68).

According to this definition, 'bodies' are the most dynamic element, the primary "reckonable resource" (Glazebrook, 2010: 2) or building blocks of the architectural surround, both as the creators of architecture, but more importantly, *as the architecture itself*. The answer, if we are looking for one, has been right in front of, if not under, behind and above our noses all along. In a world of diminishing resources, the one thing we do have in ever growing abundance is ourselves. If tactically-posed surrounds need to be constantly changing (a problem with Arakawa and Gins' architectural surrounds because they don't move and thus become familiar over time, hence the need to build enormous structures such as hotels and cities so that spatially one cannot grow accustomed to them) can this instead be achieved through the co-construction of actual (architectural) bodies, which are both collectively and alone the most dynamic element within the architectural surround? This can happen I believe, as we begin to envision architecture as the "critical holder" of ourselves.

Critical Holder

Transformation happens through the process of what Gins and Arakawa define as 'accumulation', how what comes to form the world is received and in turn rearranged as an act of reciprocity:

> *The way that the body holds itself, the many ways it holds itself, on many different scales of action, and the way it holds the world is cumulative. All the holdings you have experienced, all the holding of you and by you, moves within and through your holding of yourself and has a part in your holding onto something* (Gins and Arakawa, 2002: 83).

This sense of an interconnected holding/being held collapses any distinction between the body, the architecture that houses it and the biosphere (bioscleave) that predicates its existence, necessarily dissolving any conceptual demarcation between 'nature' and 'artifice', or 'organism that persons' and 'bioscleave'. In the context of the biopolitical paradox, Gins and Arakawa point out: "In the twenty-first century, philosophers need to construct the conditions what will cause answers to be forthcoming" (2002: 88). Interesting to note in this passage is how constructing "the conditions" can also mean simply constructing the conditions of interpretation, of figuring new ways of doing the same things in the same spaces. In light of the popularity of deconstruction as an interpretative practice in the latter half of the twentieth century, so too is *re*-construction possible through a hermeneutic, interpretative rearrangement of the shape of awareness, made available through the heuristic thought procedures of Arakawa and Gins. This can translate into the shifting of habits from the way we use resources, to the expectations we have as consumers and concomitantly, *reciprocally*, harvesters and/or producers of those resources. Arakawa and Gins' hermeneutic approach to leafing through the world enables a starting point to begin thinking the (re) construction (again, albeit differently) of the (emergent) conditions for life, where every 'thing' becomes reconsidered, reusable, recyclable and "redirected" (Fry, 2009). Here, everything is useful – nothing is thrown away. Indeed, this is a practice where no such thing as 'nothing' exists.

The "holding" described by Arakawa and Gins is critical in more sense than one, for we can't help but hold the architectural surround (that being architecture and environment - *bioscleave*) that holds us, albeit in what is a very tenuous holding given the consequences of the way it has been historically held. Holding is a reciprocal relationship where the way the organism that persons *holds*, is returned or reciprocated by way of how it is *held*. All too often the organism that persons, occupying the somnambulistic space of the procedurally known, acts unwittingly and holds poorly, holding as it and previous members of it have always done. This is due also in part to the way bioscleave holds back, already compromised and corrupted by the historical legacy of neglectful, care-less holding. So, there is a great deal of inertia, the momentum of monoculture, of procedural knowing and doing that appears impossible to derail. Gins and Arakawa suggest that it is by deregulating our-selves from as many forms of indifferentiation, of institutionalisation as possible, that we can break the historical legacy of systemically embedded "procedural knowing". To reiterate:

> *What is preventing us from inventing ourselves further? The answer comes quickly; the species has not yet learned how to have its members pull together at*

the same time as they continue to form themselves as separate individuals (Gins and Arakawa, 2002: xi).

Deregulation *from each other* gives the opportunity for the self to act responsibly *and* with authority, which I argue we as individuals currently cannot, or fail to do, because we perceive the problem as too large and beyond anything but the omnipotence of governmental and institutional bodies to influence. I believe this is the result of cultural conditioning, of a learned helplessness produced by subservience to institutional arrangements, where all ethics and agency are displaced by the aphorism that 'it's under control'. How to untangle ourselves from the inertia and complacency wrought in the habitual, how to learn to 'un-learn' the procedurally known, to become 'embodiedmindful' of the many dimensions of landing site awareness, that necessarily leads to the awareness of the need to 'construct' a future, is all in a day's work.

Daily Research

The researcher in residence, practicing the art of being one of the many bodies of an architectural body, attains transformational capability by researching daily the operations of what makes the body, individual and species alike, tick. So far in this thesis I have described the way subject-hood in the 21st century is increasingly understood as a construct of information, a product of the emergent genomic and molecular technologies that now come to define it (Rose, 2001; Rabinow and Rose, 2003; Waldby, 2005; Neilson, 2006). In light of the advent of synthetic biology, the subject of Chapter 8, where whole new biological organisms can now be constructed from biological 'bits' or "BioBricks", a practice that is actively evolving as an open source, 'Do It Yourself' (DIY) cultural phenomenon (Roosth, 2010), I argue that the emergent 'molecular' subject will not only begin to engineer biology itself as a form of autonomous liberalism (ibid.: 129), but will, as the mandate of immortalist biopolitics dictates, ultimately use the self as the *object* of experimentation. It is at this site of the self that the convergence between the informational and the biological becomes ontological, where as an ongoing process or practice of "daily research" "puzzle creatures" must by necessity explore, as an end-less process of questioning and experimentation, "who or what we are as a species" (ibid.: xii), and just as important, what this species 'is' in relation 'to'. Using synthetic biology the self becomes molecularly deregulated, yet remains inextricably connected to the co-extensive process of biological construction that 'extends' in all directions everywhere. The deregulation of the *synthetic organism that persons* is I believe the most qualified person for the job of future creation, both of itself *and* necessarily the species, precisely because its idiosyncratic interface with the world is the essential ingredient necessary for the cultivation of difference, diversity and complexity, which cybernetic information theory tells us are the antidotes to entropic decay (Hayles, 1999: 78). Using Arakawa and Gins' heuristic procedures, the construction of subjectivity implicit in DIY synthetic biology can occur not as a teleological destiny to be fulfilled, but a moment to moment, anti-teleological process of 'daily' experimentation and discovery without end, where information can become language can become discourse – and maybe even poetry.

Indirectness

In this chapter I have redirected Arakawa and Gins' "crisis ethics" (2002: xviii) from the 'crisis' of individual mortality to that of the species as a whole, the argument being that the failure to do so leaves little hope for that which Arakawa and Gins aspire to. This move toward redirecting or *in*-directing (indirectness) is a strategy Arakawa and Gins use themselves, and is, along with the cultivation of uncertainty, one of the primary techniques I use in the formulation of generative approaches to the biopolitical paradox. As Spurse explain:

> *Engagement is indirect. It is imagined that direct action with a thing is best –*
> *a one-to-one causal relation. But this is an illusion, stemming from a false*
> *desire for purity. Nothing happens directly; everything occurs through*
> *alliances, entanglements, tools, bodies and concepts. We all need mediators*
> *and modulators. And these mediators do not always know their intention to*
> *engage until they reach a new emergent relational state* (Spurse, 2010: 2).

In this thesis, and most notably in my appropriation of the work of Arakawa and Gins, I have used indirect methods (as Arakawa and Gins teach us to do) as a way of imagining future construction. The first way I have done this is by targeting the individual self/organism person, and not institutional decision making powers, in the pursuit of enacting transformative change. This approach runs contrary to the mainstream focus of energy and attention dedicated toward lobbying and/or infiltrating institutional structures to make transformative change. Evidence suggests this is not working. By instead placing faith in individuals and the bottom up emergent potential they can collectively create, I believe that, indirectly, the people for who change needs to be made (not corporate bodies and certainly not governments that are essentially corporate bodies) will through self interest enact their own means of self preservation through self-transformation. This can only come about by giving them the power to do so, which can, in turn, only come about through their deregulation. Deregulating, instead of increasingly prescribing how people should think, act and be, offers the opportunity for people to, as Arakawa and Gins suggest, "invent" themselves further.

The second way I have used indirectness is by applying Arakawa and Gins' project indirectly by appropriating the goal to reverse mortal destiny and redirecting it instead toward a reversal of the entropic destiny of the biosphere upon which all life (and Arakawa and Gins' much coveted ideal) is predicated. Ironically, we cannot achieve the former reversible destiny ambition without first achieving the latter. Thus the reversible destiny project itself is now defined by the very biospheric coordinates that prefigure it's possibility, where *to not die* foremost implies that we go to all lengths, to the "nth degree" (Gins and Arakawa, 2002: xi), to ensure the conditions for ongoing life are made possible in the first instance. Furthermore, in terms of the way we are increasingly required to navigate uncertainty in a world of accelerating emergency and danger due to overpopulation, resource depletion and natural disasters from global warming, reversible destiny may have to be practiced as a daily exercise where deciding not to die literally takes place on a moment by moment basis. In this capacity it could be said Arakawa and Gins are irresponsible in the way they maniacally encourage the 'not dying' of the species without a concomitant address of how the planet will cope with larger volumes of people living within it. Saying that, perhaps indirectly Arakawa and Gins do speak to issues of ongoing sustainability? If

we were to hypothetically launch ourselves in an all out attempt to live longer, as Arakawa and Gins prescribe we do, then perhaps this impetus to care for the biospheric context into which that longer living is situated would be more pronounced than it is under a finite biology whose desire seems simply to satiate the self as much as possible through the excessive consumption of goods and services in *the time available*? Arguably the best resource we have to overcoming the multiple and compound problems associated with the biosphere is human intelligence, given the more people there are the more collective intelligence there is to produce an ongoing and emergent future (Hughes, 2008; Kurzweil in Ptolemy, 2011). Either way I choose to appropriate and apply reversible destiny in a variety of indirect ways (not at all stipulated or intended by its authors) for the purpose of reversing multiple destinies.

The third way I have used indirectness is by seeking to realise something akin to the architectural body hypothesis without actually building a tactically posed procedural architectural surround in which to do so. Given a review of the defining coordinates of bioscleave reveals we may not have the time or resources to 'build' an architectural body on the scale required, I choose instead to build the architectural body hypothesis exclusively as a heuristic practice that guides individual selves to a self (and in turn species) transformation. As bodies are increasingly recognised as the most dynamic element in the architectural (bioscleavic) surround, re-building the self-perception, identity and thus activity of bodies is the means by which I argue the architectural (bioscleavic) surround can be transformed in the most immediate and dynamic way. Saying that, the potential for reversible destiny residences or pedagogical spaces to be built as centres of learning embodied cognition and communal devising, does exist to a limited degree, as does the potential for the existing built environment to be retrofitted accordingly. However it is not the means by which I choose to focus my energies or attentions here.

The fourth way in which I have used indirectness is by recognising the need to shift the biopolitical model of selfhood (self care) to one more aligned with the co-extensive 'care of the self' (Chapter 6), argued here to be an ethical impetus that is innate to both self deregulation and the heuristic practice of reversible destiny as an instrument of the deregulated self. Biopolitically this would mean there is no need to instantiate a caring self (as Fry suggests, 2011: 146) through the various apparatuses of biopower, to *legislate* its existence, for it emerges or self organises as an inherent part of the deregulation process. This will be explained further in reference to the way a self organised ethics of care has emerged independently within the field of 'Do It Yourself' synthetic biology, illustrated in the following chapter.

The fifth way in which I have used indirectness is through imagining where these investigations might lead? The indirect by-product of this process is what may come of it in the context of the evolution of the species, which is why I choose to see biospheric degradation as the golden opportunity it is to explore what we are, for we now have no other choice but to. As Arakawa and Gins suggest: "Who or what are we as this species? Puzzle creatures to ourselves, we are visitations of inexplicability. What is in fact the case? Surely we must go to all lengths to find out what we exist in regard to" (2002: xii). Now, by force of circumstance, we have to find out what we exist in regard to; that is if we 'care' to continue to exist at all.

Conclusion

> *Since the world is not merely given but is constructed by the activity of the subject, the recoding of the I is the recreation of the world* (Gins, M., 1994: 251).

I argue that the deregulation of the self is the most potent way of re-coding of this "I". This is the key point of integration or intersection between Gins and Arakawa's project and my attempt to create the conditions ripe for the emergence of a self organised collective of future constructors. The recoding of the 'I' through deregulation enables us to pull together under a common purpose precisely because it lets ourselves form unfettered "as separate individuals" (2002: xi). Given it is through difference, diversity and complexity that we are offered the best shot for success against the ravages of monocultural entropy, the exploration and amplification of our unique individual idiosyncrasy to the *nth degree* is, I argue, the most viable means of constructing the conditions ripe for an emergence capable of negating and/or reversing the terminally entropic trajectories of the species. The glue that binds such endeavours together, the "communal purpose" of the species sought by Arakawa and Gins (2002: xxi), is the 'freedom' enabled by deregulation to design a future from the position where "it can no longer be assumed that we, *en masse*, have a future" (Fry, 2009a: 1).

Deregulation produces, ironically, a 'Do It Yourself' (DIY) 'self'. Arakawa and Gins' 'researcher in residence', practicing the 'art' of embodied cognition, is essentially a DIY practice given the individual self is the only inhabitant of the thought frames and ontological experience particular to that 'cognitive' self. This kind of 'DIY' architectural re-imagination of the human/organism person reflects a deeper history of DIY 'architecture'. From the Ant Farm Group in San Francisco who in the mid 1960s formed an 'underground' culture of architectural introspection and experimentation (Lewallen, 2004), to the Jersey Devil Architecture Workshop (Piedmont-Palladino, Alden Branch, 1997) and other design/build movements that took place in and around Vermont's Mad River Valley (Cohen, Sagan and Dann, 2009), the idea to reclaim the designed and built environment as a user inhabitant experience is a thriving culture within itself. Relational to the snapshot of generative approaches outlined in the previous chapter, these incidences of DIY architecture beginning in the 60s can be genealogically linked to the popularity today of 'DIY Urbanism'. A broad title given to document the rise of various DIY interventionist models of social change taking place around the world (most recently catalogued and analysed by Mimi Zeiger in *The Interventionists Toolkit* (2011)), DIY Urbanism is designing and building a retrofitted world reclaimed as a 'Do It (make it) Yourself' phenomenon, evidenced by the rise of 'Guerilla Gardening' (Reynolds, 2008), 'Environmental Health Clinics' (Jerimijenko, 2011) and 'Maker Fairs' (Dougherty, 2011), to name but a few examples. The continuing enablement of individuals and small collectives to access the power of production as a DIY practice, in particular the practice of embodied cognition championed by Arakawa and Gins, is the central inspiration for the deregulated self hypothesis, and the subject of the following chapter that examines the potential for the emergent phenomenon of 'synthetic biology' to be practiced in a similarly DIY way. This thesis will argue that synthetic biology is a critical, indeed essential *technē* to the project of future construction. Here I propose that the generative approaches outlined thus far, in particular the anti-teleological procedures of Arakawa and Gins, can

inform the process of DIY synthetic biology in ways that steer its potency as a transformational *technē* toward an open-ended futuring condition.

Chapter 8: The Deregulated Self

Foucault begins to develop his concept of "governmentality" to encompass the variety of ways of problematizing and acting on individual and collective conduct in the name of certain objectives which do not have the State as their origin or point of reference. And as he develops this line of thought, he distances himself from the view that such power over life is unambiguously nefarious. This is also the turning point that leads Foucault to a fascination with ancient modes of subjectification and the possibilities of freedom. In this context, it is worth remembering that medicine is perhaps the oldest site where one can observe the play of truth, power and ethics in relation to the subject, and to the possibilities of a good, or as the Greeks would have it, a flourishing life (Paul Rabinow and Nikolas Rose 2003: 7).

Bio-power originally described a set of "procedures" and "technologies" that aimed at controlling the body; but as Foucault discovered as he was examining the history of sexuality and the way ancient thinkers in Athens and Rome would talk about the "care of the self," the same procedures could also be used to free the body, to teach it "how to live" better. Foucault sums up this type of "classical" and pre-Christian problem as the fundamental question: "which technē do I have to use in order to live as well as I ought to live?" (Rabinow, 1984: 348) (Jean-Michel Rabaté, 2003: 6).

Do not ask me who I am and do not ask me to remain the same: leave it to our bureaucrats and our police to see that our forms are in order (Michel Foucault, 1972: 17).

In this thesis I have endeavoured to imagine how the biopolitical citizen might be re-imagined, re-engineered and *redirected* in the 21st century context to act as an agent capable of practicing the 'art' of future construction. Chapters 6 and 7 outline alternative epistemological knowledges and ontological practices from art and design that understand the logic of change needed in this regard as not one of 'arrival' at the abstract ideal of 'sustainability' (predicated as it is on the basis of a stable, eternal, immutable 'nature'), but as an ongoing 'process' of 'transformation' that works within the contingencies (and legacies) of 'everyday' life in the here and now. The deregulation of individuals is, I argue, the swiftest method of cultivating difference and diversity from this 'everyday' context, accelerating the 'processes' or 'procedures' needed to counter the omnipresence of anthropogenic normalisation and standardisation, the handmaidens of biospheric entropy.

Located historically, deregulation is the logical extension of biopolitics, given that historically, biopolitics is a process moving from biopower, the power of sovereign rule to take life, toward biopolitics, the creation of ever more autonomous (deregulated) individuals acting in their own self interest toward the optimisation and maximisation of life. The deregulated self I propose merely extends the logic of biopolitical self autonomy to the *nth degree*. Importantly I make the distinction that I do this not for the purposes of relinquishing the state of the burden of care for this citizen, as is the historical precedent, more so for the fact that deregulation is, I argue, the soundest means of constructing the conditions ripe for a bottom up emergent potential, a *more than the sum of its parts* compound resurgence of life necessary to negate the encroachment of entropic decay in all its compound and accelerating forms.

The deregulated self that I champion is, I argue, well within our grasp, for it is merely the extension of processes of two forms of deregulation already in motion: 'top down' institutionally mandated deregulation; and 'bottom up', spontaneously emergent, 'Do It Yourself', 'open source' deregulation. This latter form of deregulation is the result of the freedom of information made available through the ever increasing ubiquity of information technology platforms. The role that self organisation, an enigmatic constitutive property of life, plays in the deregulated self hypothesis is of paramount importance in this regard, the rise and influence of information technology over the past three decades being a quintessential example of this. Central to this hypothesis is the role newly emergent and/or 'future' technologies will similarly play in the task of 'future construction'. The emergence of 'Do It Yourself' synthetic biology, or 'DIY bio', though in its infancy at present, when coupled with an open source culture ripe to exploit it, will become, I argue, a potent, indispensible tool for the re-construction, albeit differently, of the conditions for life.

The role self organisation plays at the individual level, both in terms of the organisation of the individual itself *and* the organisation of the collective of those individuals as a 'futuring' politic (an *indirect* "dictatorship of sustainment" (Fry, 2011: 123-4)), is crucial. This 'state' of 'self' organisation must, by the logic of its own processes, extend its 'self' epistemologically and ontologically beyond race, class and/or national affiliation, arriving as a global constituency operating on a currency based on the value of difference and diversity. How well these deregulated, expanding differences self organise and 'fit' (no longer survival of the fittest, but survival of who is the best fit) to produce ongoing negation and/or reversal of biospheric entropy, is the challenge this hypothesis sets for itself.

Deregulation

The deregulated self is not an especially new or radical concept, merely the extension of a culture of deregulation already in existence. Historically, deregulation as I frame it here has occurred primarily in two distinct ways: first, through neo-liberal deregulation of select elements of the State's power, what I call 'top down' deregulation; and second, through what might be called 'bottom up' or spontaneously emergent deregulation, made available primarily through the ever growing freedom of information provided through the ubiquity of information technology platforms, namely the internet via personal computer and the smart phone, and from them the Web 2.0 interface. I will address these two independent instances of deregulation separately.

As stated in Chapter 3 of this thesis, the World Bank's designation in recent years of 'risk' and 'risk management' as a crucial taxonomic and organisational discourse, is reflective of broader bureaucratic trends over the past half century that can be identified as liberal, or more contemporaneously, 'neo-liberal'. In this regard the World Bank's actions can be seen as a further culmination of what Foucault originally identified as central to the contemporary charter of biopolitics – that ever increasing degrees of individual autonomy would be granted through the withdrawal of the state. To reiterate the argument stated earlier by Patton:

> [Foucault suggests that] *liberalism … formed the historical framework, the*
> *system of government reason, within which the techniques of biopower would*

be deployed ... liberalism is presented as a distinct practice of government defined above all by its acceptance of the idea that society and its economic processes follow laws of their own which governments must understand and respect ... Against the idea that the population was in need of detailed and constant regulation, liberalism advanced a conception of society and the economy as naturally self regulating systems which government should leave alone (Patton, 2004: 7).

Foucault saw in the logics of laissez faire free market capitalism that forms of biopower as inherited from the sovereign age would ultimately yield to biopolitics, the fragmentation (via deregulation) of biopower (Lazzarato, 2008). He further identified that this process is one increasingly focused on the individual who would become responsible for her/his own conduct and behavior 'within' the overarching discourses of the free market. Indeed the formation of citizenship in such neo-liberal societies is predicated by free market mechanisms that necessarily entail the conflation of the social, the political and the legal with the logic of neo-liberal economic rationalism. As Lemke points out, neo-liberals:

transpose economic analytical schemata and criteria for economic decision making onto spheres which are not, or certainly not exclusively, economic areas … [they] *attempt to redefine the social sphere as a form of the economic domain* (Lemke, 2001: 197).

As argued in Chapters 3 and 4 of this thesis, it is through such an attitude that the biomedical model of 'self care' is employed, displacing the burden of ageing populations from the state back onto ageing individuals themselves. Such state driven forms of deregulation have occurred not just through the relinquishment of its obligation to individuals, but earlier, through the deregulation of financial markets in the interests of fostering greater competition in the form of 'free trade'. Initiated in principle by the 1980s Reagan and Thatcher era of politics, this not only included the large scale deregulation of global financial markets, but later trade under the banner of 'globalisation', the predominant model and practice of international economic growth today. Of particular interest to the themes of this thesis is this shift in neo-liberal policy that has exponentially hastened the flows of monocultural efficiency and hence, biospheric entropy. As argued by Kunstler, globalism:

was not so much a new idea as the logical and inevitable result of self-organising systems elaborating themselves under the influence of renewed, immense energy inputs – the ultimate cheap oil way of doing business in the closed system that is planet earth ... [it is] *the ultimate generator of entropy* (Kunstler, 2005: 220).

The second way in which human society has become deregulated has taken place as a process of 'bottom up' spontaneous emergence. The ubiquity of the internet via information technology devices such as the personal computer and the smart phone has catalysed a decentralised, open source, Do It Yourself (DIY) culture that is now an everyday phenomenon thanks to the rise of 'Web 2.0' user driven content such as Facebook and Twitter, the deregulation and decentralisation of news through sites such as Wikileaks.org, open source software sites such as Sourceforge.net and Opensourceverything.com, music and video file sharing (beginning with Napster), medical self-diagnosis and treatment through sites such as Yourdiagnosis.com, and

political subversion in any number of the grass roots uprisings in recent years, the events of the so called 'Arab Spring' and 'Occupy' movements in 2011 both 'self organised' using the tools of social media. These are but a few of the ways in which the democratisation of information, made available through the internet and enabled by the personal computer and the smart phone, has revolutionised the way we engage with, understand, organise, plan and act in the world. Their continuing success suggests open source cultures will continue to grow and proliferate, delivering ever greater degrees of biopolitical freedom, responsibility and risk. How information technology now extends to inform, mythologise, indeed instrumentalise and construct the powerful ontological developments taking place in the life sciences, developments that are the cornerstone of the deregulated self hypothesis, is where I argue biopolitical autonomy is headed as a similarly 'bottom up', self organised, open source phenomenon.

Though independent of each other, both top down and bottom up deregulation are at one and the same time inextricably interconnected. As the progression toward a more deregulated state meets up with newly emergent, bottom up forms of open source DIY culture, the negative effects of institutional deregulation (the acceleration of entropy generation through globalisation, and the relegation of the citizen to that of consumer, evidenced by 'risk averse' or 'risk management' biopolitics made manifest in the biomedical model of 'self care') take on new configurations that subvert the balance of power considerably. If it becomes mandated biopolitically to enhance the self molecularly with a prescribed genomic and molecular mastery, both as anti-ageing agent and (potentially) as an agent of adaptability to changes in biospheric circumstance, how will this scenario manifest as these molecular interventions become available in the home, in the same way the personal computer did?

Neo-liberal states will continue to dismantle themselves from the responsibility for both individuals and the biosphere in which they are situated as part of their economic rationalist, biopolitical 'risk management' strategy. Such a move that places the onus of biopolitical responsibility upon the individual is, I argue, *indirectly* the best move that could possibly be made, given deregulation cultivates cultures of difference, diversity and complexity, what I have argued are the necessary 'biopolitical' characteristics required to negate biospheric entropy. Here biopolitical responsibility can be translated into the opportunity to explore, to the *nth degree*, the idiosyncrasy and creative potential of each and every individual 'self'. The two critical areas that substantiate the salience of this hypothesis are 'self organisation' and 'DIY bio'.

Self Organisation

Similar to the phenomenon of 'emergence' outlined in Chapter 6, 'self organisation' can be described as the way structures or patterns appear independent of a hierarchical or central authoritative agent governing the process. Self organisation was first described by René Descartes in 1637 in the fifth part of his *Discourse on Method*, as a theoretical proposition, albeit with the hand of God (the self organiser, or in its modern day context, the 'intelligent designer') playing 'his' part:

> *What would happen in a new world if God were now to create somewhere in the imaginary spaces matter sufficient to compose one, and were to agitate variously and confusedly the different parts of this matter, so that there*

> *resulted a chaos as disordered as the poets ever feigned ... the matter of this chaos must ... dispose and arrange itself in such a way as to present the appearance of heavens; how in the meantime some of its parts must compose an earth and some planets and comets, and others a sun and fixed stars* (Descartes , 2008: 37).

Self Organisation is widely used in physics, chemistry and biology to explain the behaviour of systems, yet is also apparent in domains outside of natural science such as mathematics, computer science, the previously mentioned cybernetics information theory and economics. Most important for my purposes here, examples of self organisation are ubiquitous throughout anthropogenic culture. Sociological concepts such as 'critical mass', 'herd instinct' and 'groupthink' are all instances of what can be described as self organisational behaviour. Here, despite no central control or dominant hierarchical authority, the components of these systems organise themselves into coherent, unified and purposeful forms with intent. Because of self organisation's lack of a central authoritative agent, its prize element is the ability for it to maintain coherence in the face of adversity; that is, even if one area of the self organising system is attacked and disabled the system will compensate for this loss to maintain internal coherence. In this sense self organisation operates not as an arboreal structure, like the hierarchy of a tree, but is decentralised and spread out, 'rhizomic', like couch grass or strawberry runners that have no centre (Deleuze and Guattari, 1987). The internet is a perfect example in this context, given it has no centre and therefore cannot be destroyed or impaired, and is regenerative. Furthermore, the internet operates as a kind of collective intelligence *independent of everyone in the system knowing exactly what that intelligence is*, thus as a form of self organisation has resonances with the global brain theories of Pierre Teilhard de Chardin (1959), James Lovelock (1970) and Marvin Minsky (1987).

What I anticipate to be the result of the deregulation of selves can be interpreted as a form of self organisation, however, it is arguably more closely aligned with the process of 'autopoiesis'. Often conflated or used as a synonym for self organisation, autopoiesis, coined by Chilean biologists Humberto Maturana and the previously mentioned Francisco Varela, is used to describe the way biological systems maintain internal coherence. As stated by Maturana and Varela:

> *An autopoietic machine is a machine organized (defined as a unity) as a network of processes of production (transformation and destruction) of components which: (i) through their interactions and transformations continuously regenerate and realize the network of processes (relations) that produced them; and (ii) constitute it (the machine) as a concrete unity in space in which they (the components) exist by specifying the topological domain of its realization as such a network* (Maturana and Varela, 1980: 78) *... the space defined by an autopoietic system is self-contained and cannot be described by using dimensions that define another space* (ibid.: 89).

Autopoiesis differs from self organisation in that a self organisational 'entity' changes in response to variations from the outside, whereas an autopoietic entity maintains itself (self produces) despite such variations. For my purposes here (the deregulation of selves indirectly self organising into a futuring condition) it could be that both is the case, for self organisation via deregulation will enable the entity that is the species to maintain itself, but that very maintenance is predicated on its ability to change, and

change radically; both to adapt to changing biospheric conditions, and as a strategy to out-manoeuvre the forces of entropy through diversification and complexification. Hence, I broadly genericise these terms, as Gins and Arakawa do (2002: cover) in an attempt to describe and engage (tentatively) what remain mysterious, yet indisputably apparent instances of 'generative' emergence.

Self organisation exists in biology on many levels, from birds flocking and fish schooling, to operations of homeostasis, morphogenesis, and autocatalytic networking, to name but a few. Importantly, self organisation operates ubiquitously at the molecular level. The relatively recent advent of synthetic biology, the building of new organisms from scratch, enables self organisational characteristics to be manipulated toward anthropogenic 'ends'. The following section illustrates how this is manifest in the present day, and what it means for the pursuit of future construction as we move away from a biology of control (such as genetics, covered in Chapters 3 and 4) to a biology of 'construction'. The role self organisation plays in the deregulated self hypothesis as a 'biological' phenomenon is of paramount importance in this regard, for the coming era of synthetic biology, where the biological and the social become co produced, *co-constituted*, is where I argue the 'deregulated self' can come to fruition as the vanguard of what Craig Venter described earlier in this thesis as the next "Cambrian Explosion" (Venter, 2008).

Synthetic Biology

Genetic engineering involves what is now the routine alteration of the genetic makeup of an organism via the introduction of 'heritable' material prepared outside of it. Akin to a cut and paste exercise, genetic engineering transports the characteristics of one organism into those of another through 'DNA recombination'. This process began with the earliest forms of agriculture, from seed selection to the grafting of one species onto another, up to more sophisticated practices today such as genetic cloning, Dolly the sheep being the most popular example. Synthetic biology, on the other hand, is the radical next step that builds on genetic engineering by designing and constructing new biological functions and systems not found in nature, using artificial molecules to reproduce emergent behaviour that are found in nature. Synthetic biology is thus the ability to produce artificial life, evolving to the point where the Craig J. Venter Institute manufactured in May 2010 what is thought to be the world's first synthetic organism, a complete genome of a bacterium from chemicals transplanted into it from another closely related bacterium. Popularly understood as the closest human beings have come to playing 'god', synthetic biology promises to transform life as we know it, echoing Venter's conviction (noted earlier in this thesis), that his work is:

> *not Genesis ... [but rather, is] building on three and a half billion years of evolution, creating a new version of the Cambrian Explosion where there's massive new speciation based on digital design ... Our only limit now is biological reality and our imagination* (Venter, 2008: online).

The advent of synthetic biology changes everything previously known about biology, as both a study of biology *and* the way that study *is studied*, that is, as a methodology. The most important change to both instances is that the 'object' of this form of science is not what it used to be. The goal of biology used to be about the 'control' of

the biological, which was simply a case of understanding how something worked in order to find out what it is. The cloning of Dolly the sheep was a landmark moment in this context. Today the goal of biology is no longer one of control but 'construction', where understanding the biological comes about precisely through the experimentation that takes place in its manufacture, in its *doing*. Thus the goal posts of biology have shifted, yet so has the game that is being played where nobody is quite sure what the rules are, if that is there are any at all?

I will now catalogue the major shifts that have resulted since the advent of synthetic biology; how biology is now post-organismic; what Bio Bricks are and do; the importance of active construction over passive observation; and what all these mean in an increasingly 'open source' culture where the "democratisation of science" (Kroto, 2002) opens the possibility for a 'Do It Yourself' synthetic biology movement to emerge. This analysis forms the core rationale of the deregulated self hypothesis, accompanying the deregulated reconfiguration of language noted in the previous chapter, to denote how the architectural 'body' can become an understanding of architecture at the level of biology. Not dissimilar to – yet not to be misinterpreted as – what Frichot calls the new "biotechnological paradigm in architecture" (2011) (the work of Michael Hensel, Michael Weinstock, Achim Menges, R@Sie and Biothing), which 'represent' biological processes, I instead imagine bio architecture to 'embody' these processes, that is, bleeding into and throughout each other as co-extension. Here, under the dominant 'you break it you own it' neo-liberal 'pottery barn' rule of politics suggests, if every animal, plant, insect, bacteria, mineral, molecule, atom and quark carry the residue (or viscosity) of anthropogenic influence, then we 'own' the responsibility for what goes on now in the molecular structure of the biosphere. This translates biopolitically to the responsibility to biologically engineer and construct a future from the position "where it can no longer be assumed that we, *en masse*, have a future" (Fry, 2009a: 1). This molecular democracy begins in the form of 'information' or 'BioBricks'.

BioBricks

Biology can now be described as 'post-organismic', given that synthetic biologists no longer do biology on the level of the entire organism as a whole, instead operate at the level of experimentation and manufacture, treating biology as a "series of partible functions that can be ported across organisms" (Roosth, 2010: 34). These "partible functions" are now stored and distributed by the Registry of Standard Biological Parts at the Massachusetts Institute of Technology (MIT). Popularly known as 'BioBricks', they are housed both physically as genetic material in freezers and digitally as code in computers, making the stuff of biological life (not organisms themselves but the stuff of organisms) partible, portable, abstractable and standardisable. Genes from different organisms are transportable between organisms. They can be used interchangeably, and thus work to dissolve the distinction between species, opening up the possibility of hybridising, or even more radically, manufacturing them from scratch in a computer as an arrangement of information. This development not only blasts open the limits of what was thought possible biologically, but concomitantly opens the door to who can practice synthetic biology. Sophia Roosth, whose anthropological analysis of the socialities behind synthetic biology, *Crafting Life: A Sensory Ethnography of Fabricated Biologies* (2010), describes BioBricks thus:

The parts are designed to promote and maintain a "moral economy" among synthetic biologists, one in which they edit, tweak, improve, characterize, and — most importantly — generously share their biotic research tools. The standardized biological parts they construct thus embed the values, norms, and aspirations of their community of practice (Roosth, 2010: 93-5).

A luminary figure in synthetic biology circles, former MIT employee and one of the founders of the Registry, Drew Endy, is an advocate of the Free Software/Open Source (FS/OS) movement, a place where people debate the issues and themes of 'Open Source', but most of all share source code, question the meaning of 'openness' and above and beyond all else, cultivate a culture of sharing and collaboration (Kelty, 2008). Endy was part of the team that started 'iGEM', the International Genetically Engineered Machine Competition at MIT, which began as a way of 'outsourcing' the development of synthetic biology to the next generation:

At its core, though, iGEM is about making synthetic biologists, which it accomplishes by making students build, borrow, edit, and share BioBrick parts. It tries to convert undergrads interested in biology, bioengineering, or computer science to synthetic biology by teaching them how to work with standardized biological parts, and to reward them for adhering to the norms of the synthetic biology community, of which freely exchanging materials and information is foremost. Synthetic biologists even draw a parallel between assembling and distributing standardized biological parts and assembling and distributing new synthetic biologists. As Randy Rettberg said in a conference lecture reporting on the 2006 iGEM competition, "We manufactured 450 synthetic biologists and we shipped them out to the world" (Rettberg 2007) (Roosth, 2010: 93-5).

iGEM has grown from 5 teams in 2004 to over 100 teams and over 1,100 participants in 2010. The locus of distributing the knowledge and skills to practice synthetic biology to the best and brightest of the next generation, iGEM exemplifies the ethos of the synthetic biology community that aims to embody freedom as a shared commodity, making synthetic biology not only a unique form of scientific practice, but also a powerful form of social engineering. In synthetic biology, understanding comes from the making and sharing of results. For synthetic biologists the more people involved, the more making that happens, the more that research prospers as the pool of shared information grows larger, thus expanding the potential of what is thought possible biologically. This theme is omnipresent throughout synthetic biology circles that champion not a sterile objectivity, but participation through experimentation. As Roosth describes it, "Synthetic biologists' hackerly stance towards bioengineering is underwritten by BioBrick parts' putative modularity, as practitioners value collaboration and sharing and posit that standardizing genetic components will engender 'openness'" (2010: 54). Furthermore, synthetic biologists seek to "forward-engineer a community dedicated to Open Source approaches to biological engineering" (ibid.: 61).

This "hackerly stance", which has deep and profound social roots in the information technology revolution that began in the 1970s, is used by synthetic biologists as a mythology for the far reaching consequences of their actions as "forward engineering" progenitors of a technology that has the power to substantially change the world. Hacking, the process of entering a system, legally or otherwise, to modify

any or all elements of it, describes both the historical context underpinning synthetic biology, but also the method by which they practice their craft, which literally 'hacks' into the (formerly pure, stable and eternal) 'nature' of biology. However, unlike the reputation earned by their earlier computer hacker counterparts, the early formative stages of the synthetic biology hacker community appear to have a strong ethical and moral focus (Schmidt, 2008; Bennet, 2010), a seemingly inherent quality that is itself an example of self organisation at work, largely the product of the culture around which synthetic biologists 'construct' biology.

Construction

The reader may have noticed the repeated use of terms such as "constructing the future", or "future construction", throughout this thesis. Synthetic biologists are sensitive regarding how their work is projected and understood in the public domain. As Endy states, "We don't *create* biology, we *construct* it" (Endy in Roosth, 2011: 55). Synthetic biologists avoid using 'create' to describe their work, says Resma Shetty, "because of its god-like connotations and because it is not scientifically accurate" (Roosth, 2010: 55). As previously stated, biology is now 'post-organismic', that is, those working in the field no longer 'do' biology on the level of the organism as a whole, instead they operate at the level of experimentation and manufacture, treating biology as a "series of partible functions that can be ported across organisms" (Roosth, 2010: 34). Thus, the goal of biology has changed from 'reading' genetic code as a method of obtaining biological knowledge and therefore control, to 'rewriting' genetic code as an act of biological construction. This monumental shift blasts open the preconceived categories, models, and standardisations by which we understood life that, now at the dawn of the synthetic age, is hybrid, unstable, unfamiliar and chimerical. As stated by Roosth:

> If the various genome projects of the 1990s sedimented the genome as the signature of a particular species, then synthetic biologists are building a heteroclite taxonomy of parts and devices that genetically draw together diverse species and socially draw together a community of practitioners devoted to and defined by their propagation ... Though they adhere to composition standards, the biotic things synthetic biologists freely exchange are composed of trans-species and multi-organismic genetic exchanges ... Transgenic critters, such as strawberries bearing fish genes, have been troubling relatedness — species, lineage, consanguinity — for some time (Roosth, 2010: 97).

Taking her cue from Donna Haraway (1997; 2008) and Sarah Franklin (2007), Roosth here points toward synthetic biology as a significant moment in the erasure of the boundaries between species, nature and artifice. This erasure applies also to the erasure of the abstraction between an 'objective' scientist/researcher and the 'object' under scrutiny, to be discussed shortly. Ironically, in a twist of what Chapter 4 of this thesis presented as the potential for a biotechnological imprisonment of the self through genomic and molecular standardisation that entails the loss of definable character and human "openness" (Žižek, 2005; Murray, 2007), synthetic biology's culture of openness and sharing instead facilitates the empowerment of that self. Open source sharing in the form of the communal pooling of the research undertaken by the synthetic biology community using BioBricks, is itself in a state of 'self organisation'. The diverse range of human ingenuity, coupled with a powerful technology of mythic

proportion, is the cornerstone of the deregulated self hypothesis, which comes to fruition in the form of 'DIY bio'.

DIY bio

Launched by Jason Bobe and Mackenzie Cowell, the first meeting of DIY bio was held in May 2008 in a bar in Cambridge, Massachusetts, adjacent – ironically – to a very large biotech company (Roosth, 2009). The meeting was attended by a group of 25 eclectic individuals, from university professors to high school students, who gathered to answer the question posed by Cowell: "Can molecular biology and bioengineering be a hobby?" (Roosth, 2009: 124). So far I have described how a culture of open source sharing that celebrates the achievements of the hacker, is a cornerstone to the advent of synthetic biology. From the outside this trait appears to be a product specific to the culture of MIT. However, as Cowell pointed out at the meeting, the real inspiration for DIY bio begins elsewhere.

The Homebrew Computer Club started in 1975 for amateur enthusiasts of electronics and computers. Born in what was to become 'Silicon Valley' in Northern California, its original members, who included Steve Jobs and Steve Wozniak, the founders of Apple, began working on the then 'radical' idea of making computers more accessible to everyday people, ideally in the home. The question that had been posed at the first meeting of the Homebrew Computer Club, as reported in the first issue of its newsletter, was: "What will people do with a computer in their home?" (Moore 1975). The question Cowell posed to the crowd gathered at the first meeting of DIY bio echoed that earlier question: "What will people do with *biology* in their home?" (Roosth, 2010: 125). Not only do synthetic biologists have the information technology revolution to thank for enabling their scientific practice to exist, they in turn draw on the beginnings of the Home Brew Computer Club as a mythology by which to inspire them toward the potential for what it is they are doing biologically. The strikingly analogous relationship between the two domains, in particular the way they both concentrate on the 'hacker' metaphor, is indicative of this genealogy or lineage. In *Crafting The Biological: Open-Sourcing Life Science, From Synthetic Biology to Garage Biotech* (2009 podcast), Sophia Roosth describes how this metaphorical trafficking between computer culture and synthetic biology:

> *not only analogises things, like computers to organisms, but also analogises practices and socialities ... Rather than enabling large scale bioengineering, DIY biologists instead hope that standard biological parts will facilitate small scale bioengineering. DIY biologists, inspired by Synthetic Biology's analogy of biology as computer, fired up by how easy synthetic biologists make working with bio bricks sound, and tired of legitimate biology being strictly the domain of professionals, took synthetic biologists' metaphor and ran with it. If life may be rebuilt to function like a computer, then that computer can be hacked* (Roosth, 2009: online).

The information technology revolution, set in motion by the backyard approach to the development of personal computing now forty years ago, establishes a powerful precedent for DIY bio. And like information technology, the 'hacker' ethos serves to dissolve the historical demarcations between 'professional' and 'dilettante', between the powerful and, to varying degrees, the poor. In the past few years a host of DIY bio organisations have sprung up to inform, educate and empower people to practice

synthetic biology. DIY bio (diybio.org), Biodesic (www.biodesic.com), BioCurious (biocurious.org), OpenWetWare (openwetware.org), Genspace (genspace.org) and Hackteria (hackteria.org) amongst others, all contribute to what is an innovative, open source environment. As BioCurious state on their website:

> *Science was once a cultural activity, carried out by wealthy "gentlemen scholars" who had the leisure and material resources to experiment. The 20th century saw an unprecedented centralization of science around an industrial model. The plummeting costs of enabling technologies has brought meaningful biological research back within reach of the independent citizen scientist. From Bio-Art to BioFuels, the wave of next generation biotech applications is set to transform our culture and economy. BioCurious will be Ground Zero for this revolution* (BioCurious, 2009: online).

According to Rob Carlson, another luminary figure within synthetic biology and DIY bio circles, DNA sequencing and synthesising equipment is subject to exponentially decreasing costs in price performance over time, a phenomenon now popularly referred to as 'Carlson Curves' that riff off the same exponential trend in the decreasing price performance of computing hardware known as 'Moore's Law' (1965). Carlson believes the age of home biology, where synthetic biology equipment will be commonplace in every household, is set to occur no later than 2050:

> *Biological engineering will proceed from profession, to vocation, to avocation, because the availability of inexpensive, quality DNA sequencing and synthesis equipment will allow participation by anyone who wants to learn the details. In 2050, following the fine tradition of hacking automobiles and computers, garage biology hacking will be well underway* (Carlson, 2001: 13).

It can be surmised that DIY synthetic biology, as Carlson suggests, will occupy a critical role in enabling everyday citizens the ability to manage and administer their own biopolitical risk. In light of the trajectories of contemporary biopolitics outlined in Chapters 3 and 4, where the neo-liberal state has in its relinquishment of responsibility and 'risk', displaced the burden of health care onto its increasingly aged, 'autonomous', 'molecular' subjects, it seems more than appropriate for an open source movement of biotechnological empowerment to emerge and disrupt the balance of power, from the 'bottom up' in this regard. Furthermore, the biospheric challenges that confront our species this century and the need to adopt any and all means to negate the entropic destiny we have collectively created for ourselves, positions DIY synthetic biology at the coal face of the necessary innovation and experimentation required to construct a future. In this context, DIY bio as a practice undertaken by everyday 'autonomous' biopolitical citizens is, I argue, the key to instantiating the necessarily profound and ongoing cultural transformation demanded of our age. The primary means of facilitating that vital need is through the deregulation of the self.

The Deregulated Self

As mentioned, the far reaching possibilities of open source DIY synthetic biology are already having a significant impact independent of the making of actual biological 'stuff'. In terms of the way BioBricks have themselves come to penetrate the cultural

operations of participants involved, Roosth describes how there is a sociological mimesis or osmosis apparent within these communities, where the tools shaped (BioBricks) have come to shape the social character of the makers of them:

> *While biohackers consider BioBricks simply to be an enabling technology, BioBricks, I would suggest, are also socially constitutive: the cluster of activities enabled by such standard parts — sharing, synthesizing, hacking, assembling — are the activities by which both synthetic biologists and biohackers not only assemble biological systems, but also assemble themselves. The "selves" biohackers here enact are liberal and autonomous actors for whom biological practice is a form of political speech, a speech arguing for rights of access to biological practice. The social and the biological are mutually constitutive* (Roosth, 2010: 129).

If, as Roosth suggests, DIY synthetic biologists enact (albeit an extreme example of) liberal subjectivity as a form of "political speech", they effectively become the literal embodiment of Rose's "ethopolitics" (2001), broadly outlined in Chapters 2 and 3 as the rights of a consumer group. Chapters 3 and 4 of this thesis describe the way subject-hood is itself increasingly 'constructed' by the emergent genomic and molecular technologies that define it (Rabinow and Rose, 2003; Waldby, 2005: Neilson, 2006). What open source DIY synthetic biology means for this emerging subject is that it will not only engineer biology itself as a form of autonomous liberalism, a form of biopolitical ethopolitics in action, but will, given the mandate of immortalist biopolitics, use the self as the *object* of experimentation. If synthetic biology is a project that is about *doing*, that is, learning synthetic biology through its manufacture, then the self driving that research, a self embedded within the process of making, becomes both the subject conducting experiments and the *object* under construction; socially, psychologically, and biologically. Heather Paxson explores the relationship between a craftsperson and sensory engagement, between the maker and the made, as a "synaesthetic sensibility". Here she describes the way scientific 'artisans' construct using "sensory evaluation":

> *While "control" and "design" conjure an authoritative distance and dominance over biological matter, thinking about how senses of taste, touch, and hearing are tuned towards biological apprehension exposes how researchers' sensoria and biotic sensescapes are co-constructed in encounter* (Paxson, forthcoming).

To construct using sensation, instinct, and an intimate knowledge of the site specific production process as the principal guiding parameter, means practicing outside the bounds of scientific reason. Instead of being an objective 'scientist', what this now means is that the autonomous liberal subject practicing synthetic biology is in fact an *artist*. In this way, synthetic biology's contribution to the collapse of the hitherto stable demarcated categories between species and between nature and artifice, signals the beginning, I argue, of the re-instantiation of the relationship between the maker and the made. If Walter Benjamin's 1936 essay, *The Work of Art in the Age of Mechanical Reproduction* (Benjamin, 1970) illustrated how mass produced objects lose their 'aura' through the severance of the craftsman or artisan from the making process, synthetic biology as a practice reinstates this aura as the subject is implicit with, or embodied within, the construction process. In this sense, the construction of synthetic biology as a DIY practice becomes not so much a 'scientific production' but

instead a 'work of art' formed by a unique relationship between the DIY bio maker and the made. Here the work of 'art' is both the 'object' and 'subject' or self, who is co-constructed socially, psychologically and, ultimately, biologically, *in* the act of making (Roosth, 2010: 97). To practice synthetic biology is thus to work upon the self, to *care for the self*, as one would were they creating their finest 'work of art'. As both Nietzsche ("our highest dignity lies in our significance as works of art" (1999: 33)), and later, Foucault suggest, to treat the self as a work of art is the greatest work a self can undertake:

> *What strikes me is the fact that in our society, art has become something which is related only to objects and not to individuals, or to life. That art is something which is specialized or which is done by experts who are artists. But couldn't everyone's life become a work of art? Why should the lamp or the house be an art object, but not our life?* (Foucault, 1984: 239-40).

As a 'post-organismic' science, synthetic biology radically opens up the possibility of what this 'work of art' could be, inviting the opportunity to think and ultimately experiment with life in malleable, creative and unconventional ways. In the context of the issues and uncertainties of the 21st century, the question posed by the ancient Greeks, "Which *technē* do I have to use in order to live as well as I ought to live?" (Rabinow, 1984: 348; Rabaté, 2003: 6), the answer can only be 'all of them' as a practice of "daily research" (Gins and Arakawa, 2002) where "puzzle creatures" must by necessity explore, as an ongoing, end-less process of questioning and experimentation, "who or what we are as a species" (ibid.: xii). As Gins and Arakawa's work attests, it is not any single action but the coordinating of many actions at once that is the most important futuring 'skill' to have within bioscleave (ibid.: 63). Synthetic biology, the complexification of bioscleave to the *nth degree*, that can only be constructed or coordinated as a subjective process, is but one *technē* available through which to "live well". However, as the *technē* that underlies all living things, and what is more, can manipulate those living things at will, synthetic biology, available as a DIY practice, in this sense can come to constitute a literal 'care of the self' in action in the context of sustaining the self *and*, proportionately, that which comes to sustain it. In this way DIY synthetic biology empowers autonomous (deregulated) individuals to construct themselves, and the world around them, in a manner that is conducive to the longevity of both. Contrary to Fry who, as discussed in Chapter 6, argued against autonomous liberalism and technological solutions as means toward his idea of the "sustainment" (2011), I believe DIY synthetic biology as an autonomous, *post*-liberal, inherently technological subjectivity, is the soundest, most viable means by which future construction can flourish.

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Despite fears that the backyard approach to synthetic biology raises significant threats to bio-security, the majority of support for DIY bio comes from within the synthetic biology community itself. This open source approach to research facilitates a broader research community with which to innovate and invent, but also, and quite spontaneously as an act of emergent self organisation, is monitored by an unwritten law of ethical responsibility. As suggested by Gaymon Bennet, an ethicist and theologian working in synthetic biology: "I think the kind of moral life we would be engaging in when doing DIY bio is very different from the kind of moral life one would engage in when doing big bio" (Bennet, 2010). Here Bennet points toward the

democratic nature of open source, against the colonisation of 'intellectual property' characteristic of corporate life science. Bioethicist Markus Schmidt agrees: "It is true that there is a kind of informal code of ethics for the hacker community that demands to *'be safe, do not damage anything, do not damage anyone, either physically, mentally or emotionally'*" (2008: 3). Big bio firms operate outside of the domain of public scrutiny, unlike DIY bio which as a self organisational, self policing activity, is by the very community nature of its participants transparent, inclusive and ethically predisposed. Furthermore, DIY bio is increasingly encouraged instead to be "DIWO" (Do It With Others) bio (Angelica, 2010), which serves to both increase the network or knowledge base, and reinforce the self policing community or neighbourhood watch, tantamount to a self organised *co-extensive* 'care of the self' in action. Top down institutional control by big bio will harbour and colonise the potential for what synthetic biology could be and do, acting not in accord with an ethics of care but exclusively to the rule of profit, as indicated in Chapters 2, 3 and 4 of this thesis.

To reiterate the statement made by Murray:

> *The real threat of such technologies lies not in the physical destruction of humanity, but in what we might call its spiritual or rhetorical dimension, an openness that is too easily closed when we intervene in our elementary particles to manipulate human physical and psychic features* (Murray, 2007: 18).

DIY bio's policy of open source everything not only diminishes the ability of large corporations to control what, how and for whom synthetic biology is produced, for it also opens up the human "spiritual or rhetorical" dimension by placing the power of this technology in the hands of the people it 'should' serve. As Christopher Kelty suggests, the best way to not close the potential of this technology is to open it up to the wider community:

> *Creativity breeds creativity. If anything can be said about the expansion of forms of public participation in biology – whether by outlaws, hackers or Victorian gentlemen – it is perhaps that the more innovation there is, the more innovation there is* (Kelty, 2010: 7-8).

As biological artist Eduardo Kac previously stated, because of our species compulsion toward monoculture and entropy generating behaviour, it is our duty as artists "to increase global biodiversity by inventing new life forms" (1998: 1). Given that it is anthropogenic normalisation and standardisation that is the root cause of the monocultural entropy machine gaining such omnipresence in the first instance, clearly, the best place to start in the diversification and complexification endeavour is with the core problem, that being our 'selves'. As synthetic biology teaches us, 'knowing' comes from the process of 'construction'. Furthermore, in this milieu knowing is not something that once arrived at becomes static, institutionalised or canonised, for the process of experimentation with living things is that as they grow, spawn, reproduce and interconnect with the vast ecologies of the earth, the process of experimentation is quite literally ongoing and end-less. In this hyper-technologised era where the rules of language are reduced to subjective interpretation, or more to the point, the subjective *construction* of data and code, what else is there to use as a guiding principle but the anti-teleological, open-endedness of Arakawa and Gins that keeps the definitive 'outcome' (itself an abstract cultural construction) in a permanent

state of flux. To 'know' or arrive at knowing, as we have historically sought to do, entails death, or in the context of the problems we face as a species, a "being towards death" (Heidegger, 1962: 299), for as soon as we manufacture (and delude ourselves into believing in) a teleology we arrive at a 'known', stop, rest on our laurels, and a stasis ensues. Metaphorically speaking we become statues, or worse still, coffins or "capsular" citizens (McLuhan, 1964; de Cauter, 2004). To echo the words of poet William Blake: "Expect poison from the standing water" (1974).

Conclusion

To return this discussion back to the initial subject of this inquiry – the Baby Boomer demographic cohort – through targeting the very self interest that is the signature characteristic of this generation I have begun to theorise ways in which Boomers as a critical demographic force could indirectly be transformed into agents of future construction. As anticipated by Foucault, the extension of liberal subjectivity as part of the process of biopower shifting to biopolitics (Patton, 2004; Lazzarato, 2008) is produced by incremental degrees of release toward biopolitical self autonomy, the biomedical model of 'self care' illustrated in Chapters 3 and 4 being a prime example of this. The mandate of contemporary biopolitics that demands individuals manage their own perceived 'risk' in an age of 'molecularisation' (Rose, 2001), where ageing individuals must subject themselves to the genetic and/or molecular gaze, positions Boomers, as argued in Chapter 4, as the most likely candidates to mainstream not only biotechnology, but also now in light of the evidence of Chapter 8, the 'bottom up' emergent practice of DIY synthetic biology. Provided the processes with which to practice DIY synthetic biology become simpler and cheaper to use, as Carlson argues they will (2001; 2003), I believe Boomers, those who in the short term at least stand to gain the most from such practices, can and will participate *en masse*. As established in Chapter 2, Boomers want to both live longer and maintain at least a minimum quality of life during those later years. The potential for DIY synthetic biology to empower individuals with the means to achieve these desires *at their will* is considerable, and in a climate where there is a significant institutional time lag for the testing and patenting of biotechnological applications to become available on the market, not to mention the cost, the DIY option becomes an increasingly attractive and affordable one, leading potentially to significant cultural change within the social groups that use it. As previously argued in Chapter 7, longer lived lives provide the opportunity for ageing populations to become more considered, understanding and caring, given the need to do so as a means to preserving the very context in which they wish to live their longer lived lives. Optimistically, in the deregulated context I suggest, I believe immortalist biopolitics *can become* biospheric biopolitics, given the former cannot achieve what it sets out to do without a successful address of the latter.

Deregulated selves employing DIY cultures – DIY bio in particular – cultivates the necessary difference and diversity required to engineer from the 'bottom up' the emergent conditions for life. Constructing a whole new biodiversity to complement and support and/or replace the existing one, albeit very differently, is the task the deregulated self sets for itself. How this proposed chimerical mutation of the biospheric elements that make up the conditions for life on earth 'should' appear is anyone's guess. However, given such a mutation must by necessity be as different, diverse, unpredictable and radical as possible, such an uncertainty is itself the essential ingredient to the diversification project, and vital to the ongoing, anti-

teleological process that does not arrive, become static or 'know' itself, other than as a perpetual project of 'knowing' *ad infinitum*. In this instance, to care is to become radical, to go out on a limb and ironically take 'risks' as a necessary strategy of biopolitical 'risk management' strategy.

Chapter 9: Conclusion

Nothing said here has the status of a proposal. All that arrives is suggestive and merely indicative ... In the end, what has to be understood is very simple: the status quo is not an option; no matter what it delivers, it is failing, defutured and doomed. A new social and economic order is not a matter of choice – it is an absolute necessity (Tony Fry, 2011: 167).

To reiterate, this thesis has not been designed as a formal 'solution' to anything. The urge to consider deregulation as the fundamental action required to enact the project of future construction is made on the basis that time is critical and action necessary. The specifics as to how, what and for whom deregulation should be made, are deliberately left open-ended, as much a strategy to embody the open ended art/science poetic of Arakawa and Gins (reverse destiny) as it is the subject of the postdoctoral work that follows on from this thesis.

In this thesis I have chosen to use Michel Foucault's concepts of biopower and biopolitics to frame how immortalist biopolitics, what I argue to be the penultimate, quintessential expression of unlimited economic growth, is paradoxically situated within a finite biospheric context. Critical overpopulation, resource depletion, global warming and species extinction threaten the tenability of the species beyond "this critical century" (Rees, 2007: online). The advent of immortalist biopolitics exacerbates this criticality exponentially. Using the contingencies of biopower and biopolitics as they operate today, this thesis has attempted to re-imagine the way biopower and biopolitics can be redirected to construct a 'futuring' condition. To do this I have investigated how bottom up 'generative' approaches from art and design offer alternative theories as to how people can empower themselves within the contingencies of the lived present, given the continuing failure of top down institutional bodies to make the necessary transformational changes required to begin 'constructing' a future. I have contributed to these approaches by concentrating on how to re-imagine and redirect the self using the existing contexts, momentums and trajectories of that self. I have championed the accessibility, malleability and adaptability of the individual for its collective potential to swiftly maneuver the species to a more favorable future via the diversity and complexity that a celebration of individualism creates. I have argued that these traits are the most salient grounds upon which to catalyse an emergent condition capable of negating and/or reversing the rapidly accelerating entropic destiny of the biosphere. Importantly, the proposal to deregulate the self is not made to the outright exclusion of institutional processes, rather I frame them as complementary; a necessary default strategy in the event institutional bodies cannot overcome the baggage of historical inertia to do what must be done. Of course there will be tensions between top down and bottom up approaches, but such tensions I argue contribute to the production of complexity necessary to the ongoing task of 'solving' (as an ongoing process) the monumental challenges we have collectively created for ourselves this critical century.

As stated, the deregulation process is already well underway, evidenced by trends toward deregulation, decentralisation and open source DIY culture over the past 30 years, but also as part of the larger progression from biopower to biopolitics identified by Foucault over the past two centuries (Patton, 2004; Lazzarato, 2008). The focus on the self, championed here as the most salient means toward constructing

transformational change, demands the greatest degree of deregulation possible to enable it to realise this transformational potential as an emergent collective that "pull[s] together at the same time as they continue to form themselves as separate individuals" (Gins and Arakawa, 2002: xi). The deregulated self realised thus is an autonomous agent capable of self government, who, in the interests of optimising and maximising its own life, by necessity must extend that same interest or 'care' both to others and the biosphere, interconnected as they are in a unified, life sustaining web (Bateson, 1972; Lovelock, 1979; Guattari, 2000). The deregulation of the self, in particular that which pertains to its own biological constitution enabled through the practice of DIY synthetic biology, serves to amplify individual idiosyncrasy and differentiation to the *nth degree*, collectively fertilising the ground for a life sustaining emergence up to and over something akin to the Cambrian Explosion (Venter, 2008). Given the impossibility of the task of futuring from the detritus of our now entropically geared biosphere, the sheer diversity and volume of difference produced by deregulated individuals, empowered by a Promethean technological platform such as synthetic biology, offers, I argue, the best chance of resistance to entropy through the self organised 'construction' of a new biodiversity capable of complementing, supporting and/or replacing (albeit very differently) the one we have nearly literally destroyed.

In the interests of catalysing a new "design intelligence" proposed by Fry (2009a: 7), an inherent part of this process has been to think, and as an embodied cognitive process, 'feel' "tomorrow's thoughts today" (Feiriess and Berrios-Negron, 2010: online). My methodology, based on Arakawa and Gins' notion of coordinology discussed in Chapter 7, has optimistically indulged the possibility, reiterated throughout this thesis, that fact is produced by the past tense of the fictions that create it (Hamilton-Grant, 1998: 69). To read what I have produced here requires indulging an open ended, indeed 'pataphysical' frame of mind that I argue is an absolute necessity given the failure of rationality in the form of physics (and metaphysics) to create the idealised 'perfect' world so longingly yearned for, and now so painfully denied. What these epistemologies have done is in fact erode the very context upon which that idealisation could ever take place. Indulging experimental, controversial, indeed – outright absurd possibilities – which this thesis has done, goes some way to exploring the way through what is by all accounts an absurd fate the species has concocted for itself. In the interests of grasping the dizzying vicissitudes of the contemporary milieu that change as fast as (arguably faster than) I write this thesis, the attempt has been, using Arakawa and Gins' notion of coordinology, to conceptually coordinate as many different 'scales of action' at once, and hold them in suspension for long enough to be able make the generalised argument that to deregulate the self makes the most salient sense in the context of a very nonsensical, entropy riddled world. This vaguely wrought avenue of potential I propose relies as much on instinct and intuition, the tools of *artistry*, as it does on any clear, rational, logical, teleological 'end driven' argument. Fortunately, as the evidence of this thesis suggests, the measure by which we need to value and in turn practice futuring is through such vague and imprecise epistemologies that can only come to fruition via the ontological embodiment, the *practice* of them. Though we may pine for the illusory certitudes of reason and rationality, the somnambulistic, autonomous deference to the 'institutions of the real' (De Certeau, 1986: 32), in light of our present condition and our collective fate, what good were they? At this critical hour I

stress the need to indulge bold, daring and 'risky' experimentation at all levels of existence.

In the context of uncertainty there is of course no certainty that any of this will work. What I am proposing is, quite literally, absurd. Yet when rationality reaches its limit, as it does with the biopolitical paradox, absurdity becomes a ubiquitous commodity. As science tells us, 'uncertainty' lies at the heart of what, for lack of a better word, is the 'operative' basis of the universe (Heisenberg, 1927). Despite the fact that since the ancient Greeks the world has been epistemologically disseminated into binary oppositions as a way of determining a capital 'T' truth, such certainties have lost their cultural currency in the discombobulating, aleatory, "fuzzy logic" (Kovko in Malone, 2001, dir.) of environments that are the indirect manifestation of the dreams – now nightmares – of reason. Saying this is not to completely disregard those knowledges that brought us to where we are in the first place, however they must be relativised in the context of other ways of knowing that are equally if not more useful. As biologist Brian Goodwin suggests:

> *What I think we're learning in respect to living in these complex systems is we have to cultivate a different way of knowing which is backed up by analysis. But instead of saying quantities and mathematics are the primary ways of knowing, I would say that it is the other ways of knowing that are primary, and mathematics and quantities can be used to reinforce and back them up. We don't lose reductionism, we don't lose mathematics, we don't lose anything of value in Western culture, but we expand it in ways that allow it to heal these pathologies that have been generated by its own limitations* (in Malone (dir.), 2001).

Speculatively, perhaps what is really needed is a deregulation of certainty, or the deregulation of the possibility of 'knowing' in absolute terms. As John Keats wrote in 1817: "I mean negative capability, that is when man is capable of being in uncertainties, mysteries, doubts, without any irritable reaching after fact and reason" (Keats, 2008).

In a world of rapidly diminishing resources the one resource we do have in overabundance is ourselves. Given the quandary we have delivered ourselves to, ironically it is only through our species capacity for adaptability, creativity and ingenuity that we are presented with a way out. The perpetual reinvention, at an ever accelerating pace and intensity, of who we are and what we do, using ever increasing degrees of creativity and complexity, is the necessary ethos required of our age. The deregulation of individuals from the economic, political, social and religious institutions that bind the human condition into a very rigid, deductive, reckonable and at worst, monoculturally 'efficient' or simply 'convenient' and therefore apathetic conception of what that 'condition' is, makes the most sense within the non-sense of the terminal trajectories embedded within the status quo. In this context, I can only believe that humanity, like certain nematode worms, has the capacity to change from being parasites that ultimately destroy their host, to (sometimes) entities with the ability to self organise into a mutually conducive, symbiotic mode of existence with its host. There is of course great risk involved in backing such a transformational endeavour as the deregulated self, however, in the current epoch of biopolitical 'risk' management, what could be more risky than simply adhering to our current trajectories that, as the evidence herein suggests, present the greatest risk of all?

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