FUTURES TRANSFORMED

Introduction

In this chapter I am concerned to understand modernity and the industrial way of life and seek to illuminate some of the key features of attendant approaches to the future. In particular I am interested in the deeply contradictory and paradoxical characteristics of contemporary futurity, a feature that did not escape Karl Marx when he famously suggested:

> In our days everything seems pregnant with its contrary…
> The new-fangled sources of wealth, by some weird spell, are turned into sources of want…
> At the same pace that mankind masters nature, man seems to become enslaved to other men or to his own infamy. Even the pure light of science seems unable to shine but on the dark background of ignorance. All our inventions and progress seem to result in endowing material forces with intellectual life, and stultifying human life into a material force. (Marx 1977/1956: 338)

Wherever we focus our attention, we are confronted with such contradictions: we find that efforts to control, manage and engineer the future produce unprecedented uncertainties. Our insatiable appetite for growth and progress seems to produce as an almost inevitable by-product, environmental degradation and pollution as well as irreparable long-term damage to the health of all reproductive life forms. As the future is progressively emptied of content and approached as an abstract, generalised future, open for the possibilities that we might create, we find that non-intended consequences mushroom and planned outcomes prove ever more elusive. Moreover, with increase in individual freedom rises not certainty but indeterminacy and, as Friedrich Nietzsche recognized over one hundred years ago, the new open-ended potential produces a paradoxical yearning for binding values. Not surprisingly therefore, key thinkers associated with early modernity were wrestling with its ambiguities and tensions. In his discussions of those paradoxes, Marshall Berman goes so far as to suggest, that

> All the great modernists of the nineteenth century – spirits as diverse as Marx and Kierkegaard, Whiteman and Ibsen, Baudelaire, Melville, Carlyle, Stirner, Rimbaud, Strindberg, Dostoevsky, and many more – speak in these rhythms and in this range. (Berman 1982: 23)

Today the tensions and contradictions have not disappeared; we have merely become accustomed to them. Our senses have been dulled through familiarity. That is to say, the paradoxes and strains have become a taken-for-granted feature of our lives. Naturalised they become invisible, which means we are no longer able to creatively engage with their potential on the one hand and their dangers on the other. Yet within the interstices of these contradictions and oppositions, I want to suggest, lies the promise for directional change. It is therefore advisable to get to know the opposing tendencies that arise with the active transformation of the future, allow ourselves to be re-sensitized and discomfited by the powers that are unleashed when social futures are engineered and transformed. We need to understand their roots and grasp their potential for effecting change at a deep structural level. In this chapter I want to begin this process by exploring the promethean nature of the power to produce futures in its many contemporary guises.

However, before we consider some of the key issues through focus on social engineering and the frontier spirit, it may be helpful to recap on some of the major shifts in approaches to the future, discussed in earlier papers, all of which were pre-conditions to the modern assumption that the future is in our hands and subject to human transformation. These shifts in approaches to the future involved a change not only in ownership from god(s) to people but also in assumptions about who counted as legitimate experts on the future. As I showed in previous futures papers, traditional societies transformed nature's cycles of return into ritual circles that recreated the social world in predictable form. This social achievement and its attendant advantages were forfeited when ritual circles were opened out into the linear shape of future-directed progress. With this change in approach, ancient trading chains of obligation and promise that stretched from the beginning to the end of time had been broken and were substituted with an abstract money economy and discontinuous relations guided by market utility. In this paper I will attend to such severed connections and the paradoxes that arise when embodied and socially embedded people operate in abstract, dis-embedded and de-contextualised social and institutional structures.

In previous papers we also showed how, in the eighteenth century, predestination gave way to the idea of progress and perfectibility. Consequently, the golden age was no longer thought behind but in front of us: it became both goal and aspiration of the pursuit of progress. Together with wealth creation and the spirit of adventure, this future potential is the impetus that moves us to innovate and invent, control and colonise, transform and traverse. Here too however, it is the process of temporal dis-embedding and de-contextualisation that opens up the chasms between intent and consequences. In this chapter paper I therefore seek to establish some of these connections in order to better appreciate where we might find openings for social change that are more appropriate to the contemporary condition of global spatial and temporal interdependencies.

The shifts, mutations, changes and displacements identified in previous chapters however, must not be thought of in either-or terms: empty, open future potential has *dis*placed rather than *re*placed embedded, embodied, contextual and individualised futures that were pre-set by nature, fate and god(s). It means that earlier forms of being, relating and understanding have not been eradicated; they have merely been placed outside the modern frame of reference, relegated to the shadow of contemporary existence where they have been rendered largely invisible. From the shadows, however, they play an influential role in the formation of paradoxes that so powerfully mark the modern age. As such, the negated modes are implicated in the specific contradictions that arise when modern futures are engineered institutionally by political, legal, economic or scientific means and when they are transformed technologically. To understand these contemporary future-transforming processes therefore, requires that we perceive them together with their invisible other, that which works its countervailing tendencies against the abstracting, de-contextualising, present-oriented principles and approaches.

Promethean Power: Engineering Progress and Peril

Prometheus, a lesser Greek deity stole fire from his fellow gods to give to the people. The gods, however, did not want to part with this procession because they thought humans not prudent and restrained enough to handle this precious gift with wisdom.

Thus, when his deed was discovered, Prometheus was severely punished (Ferguson 2000: 69, Littleton ed. 2002: 151). When we use the term 'promethean' today we refer to an awesome power to set something in motion without an equivalent power to know and be mindful of potential consequences. Promethean power, therefore, is the underpinning theme for this and the next chapter of this exploratory journey. Along the way I consider the relation between progress and peril, future making and future taking, the pursuit of speed to the point of stand-still in the present, and the impossible quest for control in the modern context of human freedom and globally networked relations.

Much has already been said in previous chapters about the idea of progress and the fervour with which progress was pursued at a historical period when the political landscape was in turmoil and science became a dominant force in society. By the time the idea of progress had taken hold, people rather than their gods were in charge of the future. With this shift in ownership, the future became a social rather than a sacred domain. As such it took equivalent position to space which, unlike the temporal sphere, had always been the domain of human action. Like any other territory which was subject to human design, planning, management and regulation, the future became a realm to be administered. This in turn brought forth new experts on the subject, in this case not experts who would predict what was going to happen to the lives and plans of individuals and groups but specialists in *producing* the future to a blueprint, which meant achieving desired results in and for the present.

These experts in future making, who were primarily drawn from the ranks of science, politics, policy, law, engineering and economics, systematically applied the principles of their disciplinary knowledge to the technological and social engineering tasks at hand. Their underpinning understanding of how the world works was a largely mechanistic one: of objects that move in space, propelled by levers and pulleys, and held to the ground by gravity. This was a world of parts and wholes that operated along linear chains of causes and effects where each cause was thought to be proportional to its effect: a hard push moving an object further than a light one, a steep hill requiring more energy to propel the vehicle than a flat road. It was a universe of bits that could be assembled into functioning wholes, taken apart and re-assembled without affecting the integrity of the object. Moreover, this system of parts and wholes in motion was amenable to counting, measurement and quantification. As such it became manageable, allowed for control and could be translated into money.

As we indicated in earlier papers, this Newtonian way of understanding reaches deep into our cultural history. It dates back at least to Greek antiquity in the 5th century BC when Anaxagoras produced the theory of atoms in motion. As Adam shows in earlier work,

> Anaxagoras (fifth century BC) opposed Heraclitus' theory of change with a mechanical theory of nature and substituted the idea of opposing forces with one single cause of motion. Nothing is produced from nothing. Nothing is lost. Coming into being is nothing but different mixtures of the same, infinitely small, indestructible 'germs' which are the absolute, unchangeable essence of the universe. Equally, death or passing away is nothing but the separation of a particular combination of those elements of the eternal essence. There is therefore no change only movement, relocation, and recombination of the unit parts into different form. The material elements are inert, without cause or

> purpose. *Nous*, reason/mind/spirit, is the single moving and motive force that creates order out of chaos, separates the elements and sets the cosmos in motion. (Adam 2004: 25)

In its modern, mechanistic and materialist guise, this perspective still operates today as a powerful metaphor in our everyday understanding not just of physical but also of social and organisational processes and relations. Its materialist principles continue to underpin many of our social efforts to control the future, create progress, and speed up development in a particular direction. Equally, the feasibility of strategies in politics and business, for example, is often decided on the basis of its underlying assumptions where interdependencies are acknowledged but thought to be amenable to designed intervention and transformation. When socio-technical processes are understood as material objects in space then *details* comes into sharp focus and the function within a system is fore-grounded, both of which advances knowledge for action. At the same time, however, we lose sight of connections, interdependencies and temporalities. In addition, this perspective concentrates attention on the present at the expense of history and futurity, with the effect that we are no longer able to grasp our products with reference to their social origin and socio-environmental destiny. Power becomes promethean in the sense that the power to act and transform is not matched by a capacity to know and be mindful of potential effects and implications.

With hindsight we recognise that many of the most successful as well as the most problematic products of the pursuit of progress have their origin in just these kinds of interdependencies and relations: fossil fuel, plastics, nuclear energy and geno-technology being just some of the most prominent examples. Thus, the exploitation of fossil fuels and the invention of the heat engine brought untold social advantage whilst being accompanied by problems of pollution and resource depletion. The creation of plastics transformed our daily lives and presented us with new intergenerational health problems that today affect the reproductive capacity of all mammals. The splitting of the atom and the production of the nuclear bomb offered not just new forms of energy production but also vastly increased powers of destruction. It left us and successors with huge financial burdens for the essential management of the waste products that remain dangerous for millennia. Its radioactivity affects all living things at the level of cells where it produces new forms of cancers that are bequeathed across generations. Genetically modified crops, finally, refuse to behave to their laboratory design specifications. All interact with their environments. Some crops have their seeds carried by the wind beyond their allocated safety zone; others are assisted by bees and other insects which carry their pollen and begin the unplanned process of contamination. All these technologies share certain features of future making. Their achievements cannot be separated from their shadow side of costs and negative effects. All rest on or are built on Newtonian foundations. All are developed on the basis of enormous promises: they *will* solve the problem of resources and world hunger in a context of a vastly increasing world population. They *will* produce cornucopia and aid the potential for world peace. They *will* eventually provide cures for many of our most dreaded diseases. Importantly, in each case the knowledge to do, create and transform is greater than the capacity to know, mind and take care of long-term consequences. Let us now consider those promises in a bit more detail by focusing very briefly on nuclear power and genetically modified food.

> 'Electricity too cheap to meter' was an early slogan of the nuclear industry some fifty years ago when the war technology mutated into production of

peaceful energy. The promise was based on the faith that fast breeder reactors would be developed which could create their own fuel while generating electricity. With hindsight we know that this promise could not be fulfilled, that of the three fast breeder reactors ever built only one is still in operation and none managed to breed their own fuel. We also know that the industry had to be heavily subsidized out of the public purse not just for its production but also its insurance and waste management. Finally, we know that decommissioning costs were never adequately factored into the initial calculations[1]. In the UK alone this estimated cost has risen within a few years from £ 56 billion to £ 70 billion and most recently to £ 90 billion (Morgan, *Observer*, June 4, 2006). Due to concerns about cost, safety and security, nuclear energy ceased to be the favoured option in many countries: the last facility in Continental Europe was built ten years ago (the new Finnish plant underway at present being an exception[2]), in the UK it was almost twenty years ago, and in the US the last new plant was built almost thirty years ago.

In response to wide-spread public distrust and political reticence, in 1996 the former president of the American Nuclear Society, Alan Waltar, launched the *Eagle Alliance* in order to 'revitalise nuclear science and technology in America'. In its membership brochure, the Eagle Alliance envisioned a world where 'a safe, healthy, and sustainable society' is realised through the continued development of the 'full potential of nuclear science and technology'. The Eagle Alliance seeks to clarify for the public that 'nuclear technologies, used in medical diagnostics and treatment, industrial processes, agriculture, food preservation, and energy, have proven beyond question to be a major benefit to all humanity'. It envisions a world in which science is fully dedicated to the service of humanity, reducing the distress of disadvantaged populations and assuring the blessings of a sustainable future for all peoples. 'We believe' continues the brochure text, 'that this vision cannot be realised without nuclear science and technology' (also Adam 1998: 194 - 209).

Today, in light of concern about global warming some of these promises return while others have mutated to suit the new context. We are assured once more that nuclear power can generate safe, secure, constant, unlimited supplies of electricity. Most importantly, and unlike power produced on the basis of fossil fuels, nuclear power is said to be 'clean'. Across the world, therefore, nuclear power is hailed as the answer to global warming. The problem with today's promises (as with earlier ones) is what is externalised in the calculations on the one hand and how the unknowable is handled on the other. To understand nuclear power as the answer to global warming necessitates that we ignore any calculations about the *contributions* to global warming which inevitably arise not just during the building of nuclear power stations but also during the very costly, toxic and polluting mining of uranium. The *Ecologist* (2006: 43) cites a study undertaken by the Canadian nuclear industry which estimated that 1.6 million tonnes of steel and 14 million tonnes of concrete would need to be produced and then transported to the chosen site. Just to set this in context, one tonne of CO_2 is dissipated into the atmosphere for every

[1] This continues to be the case, see www.tlgservices.com/corporate/trends.htm
[2] Here too however, the costs are already set to rise unpredictably see www.businessguardian.co.uk/story/0,,189070900.html

> tonne of cement produced. Even more worrying are the figures for the extraction and milling of uranium. Uranium is a finite resource which is estimated to run out within fifty years on current demand and in less than 20 years on the estimated increased demand. Moreover, the mining of uranium is uneconomical in that it requires more energy for its production than it will generate and it is highly polluting, its vast quantities of toxic waste poisoning ground water and the atmosphere. As part of the production process, furthermore, uranium needs to be enriched which entails using half a tonne of fluoride for every tonne of uranium hexafluoride. However, the contribution of fluoride to global warming is nearly 10,000 times that of CO_2 (*Ecologist* 2006: 47). This list of exclusions from the calculations on which the new promises are built by no means exhausts the numerous factors that have to be externalised, bracketed and considered irrelevant to the current debate before we can come to the conclusion that nuclear power is the best answer to climate change[3].
>
> A similar tale of selective accounting and incompatible positions between opponents and proponents applies to the debates about genetically modified food. Let me summarise here some of the high-profile public promises of the industry, which seem to be produced to a rather similar script to those made about nuclear power by Alan Waltar in the late 1990s (Adam 1998: 212 - 228; Adam 2000). Genetic modification, it is argued by its proponents, increases productivity and thus has the potential to alleviate world hunger. It can help transcend agricultural limits set by weather and seasons and provide more nutritious foods. It can increase the diversity of foods available to us. Genetic engineering of crops and animals, it is claimed, improves on nature and increases bio-diversity. It can be stored longer and decay can be held at bay. Genetically modified crops can be resistant to diseases and pests while being tolerant to herbicides and pesticides. This, it is proposed, will reduce the need for herbicides and pesticides (incidentally produced by the very companies that are developing this geno-technology with all its problem-solving and palliative powers). Despite these promises, it turned out that even over the short period since genetic modification of food has come on the public agenda, the problems associated with it far outweigh the benefits: unviable organisms, disastrous crop failures, the decline of whole species negatively affected by the crops, such as the Monarch butterfly, and health problems in the animal and human guinea pigs.

In both cases predictions failed to materialise; expectations were disappointed; trust was abused. And yet, incredibly, the same palette of promises re-emerges for old and some of the new industries on the horizon, for example, in response to public unease about the emerging nano-technology industry. How can this be? Let us consider here some answers to this question.

First, in each of the cases the public is assumed to suffer from amnesia, incapable of remembering the last set of broken promises of the science-business-politics alliance. However, on the whole, people living in socially embedded chains of relations and dependencies do remember. The problem of social amnesia, short-term memory and

[3] For the continuing debate see www.opendemocracy.net/globalization/climate change debate/2587.jsp

lack of concern for long-term effects arises not in the social lives of people but emerges instead within institutional structures. This is the case because in their professional capacity none of the institutional actors operate in equally embedded contexts. Thus, for example, politicians act on our behalf within a political framework and thus a public mandate of four to five years. Business operates in the temporal context of an extended present where focus and orientation rarely endure beyond the next shareholder meeting and the schedule of quarterly results, and where new CEOs have their exit strategy in place long before they begin to develop their restructuring plan for the company's future (Sabelis 2001).

Second, attention to the underpinning functional requisites of techno-science allows us to trace some associated yet different connections. Many of today's most successful technologies are founded, as we suggested earlier, on the disembodied, dis-embedded and de-contextualised principles of Newtonian science. The products of these sciences, however, do not exist in abstraction. Rather, they form an integral part of human social existence where they are used interactively, appropriated and absorbed into daily life. The products have become part and parcel of who we are, how we live, what we are able and unable to do (Latour 1993, 2004). Moreover, due to the complexity of modern life and the resulting division of labour, we no longer know the products of the pursuit of progress in all their facets; instead we interact with and use them on the basis of know-how and second-hand expertise (Weber 1989/1904-5). This means, in the daily context of lived techno-science, knowledge and know-how have drifted apart and the gap is still widening. This has problematic consequences and gives cause for concern. As Hannah Arendt argues,

> If it should turn out that knowledge (in the modern sense of know-how) and thought have parted company for good, then we would indeed become helpless slaves, not so much of our machines as of our know-how, thoughtless creatures at the mercy of every gadget which is technologically possible, no matter how murderous it is. (Arendt 1998/1958: 3)

Third, and closely connected to the previous point, we need to appreciate that the scientists engineers and economists who are major players in the production of progress are not exempt from this division of labour in the sphere of knowledge where expertise is narrowing into ever-decreasing specialised niches. Here, professional and private knowledge spheres have come adrift and no longer map onto each other. In their private mode of being these specialists worry about possible applications of their creations and potential perils through their use. In their professional capacity they are pursuing knowledge for the sake of advancing knowledge or opportunities for the sake of enhancing opportunities. For example, use, application and socio-environmental consequences are not part of a scientist's professional remit. They are considered not a scientific but a socio-political problem. Whenever the scientists and the lay public are brought together to discuss new technologies and their safety – be this through such efforts as 'up-stream public involvement', 'see-through science', 'citizen juries', 'public involvement in science' – these separations of knowledge spheres and concerns rise to the surface (Demos 2006, Kearns et al. 2006). The stark reality becomes apparent that at the forefront of public knowledge and the institutional production of progress no-one is in charge, no-one takes overall responsibility, nobody feels able or motivated to take the long-term view.

Fourth, and again related to the points raised above, for today's public administrators and regulators difficulties arise when technological products are treated as material objects and abstracted from their sociality, that is, from their lived interdependency with people and nature where everything connects to everything else in seamless processes that extend into an open-ended future. As *social* things technological products are not mere artefacts in show-cases. Rather, they are boundless, socio-technical actors that produce new relationships and interactive effects, adding not just to the overall good but equally to the overall entropy of its system, its waste and its pollution. This is the modern Promethean power unleashed, where connections and interdependencies have been severed, where context and temporality are eliminated from the relevant frames of reference, and where moral concerns are considered out of bounds within the knowledge spheres that are at the heart of producing both progress and accompanying perils.

Thus, in contexts where abstraction, disconnection, de-temporalisation and fragmentation of experience and knowledge abound, personal involvement, responsibility and long-term perspectives tend to be placed outside the frame of reference from which technologies are developed, tested and considered safe. Problems that accompany the successes of the era of progress, we need to appreciate, arise from those very displacements and repressions. When for example safety of a nuclear or genetically modified product is established under laboratory conditions over a time-span of a few months or years, the same product placed in the environment is likely to produce symptoms over substantially longer periods in previously untested bodies and places, working their way through organisms and their environments into an open future. From within the institutional framework historical embeddedness of products with their interactively open future is bracketed. Consequently it is extremely difficult (but not impossible) to know ourselves responsibly connected to the eventual time-space distantiated outcomes of our decisions, actions and inactions since abstract, de-contextualised and discontinuous knowledge, short-term perspectives and the division of labour facilitate the production of promethean power almost by default. Born from within the sphere of knowledge that facilitated the pursuit of progress, perils thus emerge from the flip side of that knowledge, that is, from their exclusion of the frame of reference and explicit concern. It is therefore worth our while to investigate those relations further in order that we may use that understanding to explore potential openings for approaching them differently.

Future Makers, Future Takers and the Frontier Spirit

The taming of wilderness, opening up new frontiers for settlement and human activity, prospecting new resources, exploring the invisible worlds of the deep and reaching to the stars, all these are activities where the pursuit of progress is combined with a frontier spirit. The mind that moves and creates order out of wilderness and chaos today is the (economic-technical) rational mind of modern man and (significantly less so) woman. The roots and nature of this rationalism were elaborated in the previous chapter; here I want to offer some illustrations of the kind of paradoxical effects that can arise when future-making is built on these foundations, show how future making almost imperceptible slides into future taking and offer some thoughts on the relation between the two. When we look at future making efforts such as the creation of safety, sustainability, salubrity or security we quickly note that they

seem to have their opposites encoded at the very base of their method and approach. And we can't fail to realize that, depending on the technologies involved, future taking comes in many different guises: futures may be spoilt, foreshortened or eliminated. Since the frontier spirit is pivotal to understanding those interdependencies we shall begin this exploration with short notes on this particular way of extending into the future.

The first thing to note is that the frontier spirit is not a modern phenomenon but reaches back for thousands of years of human history. What sets ancient and modern forms apart is both the scale and pace involved, especially with regard to the unintended consequences of this particular form of future making. Today the scale of effects is global. Equally, the pace of consequences such as the depletion and degradation resource has dramatically increased. This means that resources that used to be exhausted over very long periods, with the rate of depletion only just outstripping the rate of renewal, are today disappearing in a few hundred years and even decades. Thus, for example, if you take nutrients from the soil without returning equivalent amounts to the soil then erosion and degradation takes place. However it is the scale and pace that make a significant difference: one cubic meter of top soil with its ecosystem of bacteria and micro organisms, which took around 100,000 years to develop, is continuously depleted, eroded and/or salinated in less than a person's life time by industrial modes of agriculture. This means that today deserts grow where once there grew forests in delicately balanced eco-systems and interdependent plant and animal communities (Pimentel 1993, Pimentel et al. 1995). Importantly, of particular interest here are the contradictions associated with efforts to control and manage the future. Towards this end, examination of the frontier spirit can provide helpful insights into the paradoxes that arise with future making in both the ancient and the modern era.

When new territories are colonised we find secondly that the dividing line between future making and future taking is difficult to draw. The conundrum arises whether those colonisations are occurring today, have been settled a few hundred years ago or date back several thousands of years, as in the case of Meganesian settlers. The latter, for example, were deceived by their new territories' apparently unbounded resources. According to Tim Flannery (1994) the first future takers emerged some 60,000 years ago in Australasia and Meganesia when populations grew too large for their tightly delimited supporting environments. He draws on archaeological records which suggest that some of these early future makers were settlers in new lands, thus unable to draw on collective past experience of the ecological interdependencies of the habitats they had left behind. 'Without predators and surrounded by naïve prey', argues Flannery (1994: 160), 'people would have become, in a sense, gods. For they were now all-powerful beings in the land of plenty.' Lacking the benefit of accumulated collective wisdom, resources were used up faster than could be replenished and, despite great evolutionary and cultural developments, future taking became endemic in early settlers of the Pacific islands and the greater landmasses of Australasia, Tasmania and Australia.

A similar relation can be identified about the story of beef, as told by Jeremy Rifkin (1992). Rifkin's insightful study of American beef culture takes us back some 6000 years to nomadic herdsmen that clashed with settled agriculturalists in what is today the Middle East, Europe and the Indian subcontinent. At that time cattle were not only

given as sacrifices to the gods but already appreciated as an essential wealth-creating commodity[4]. Beef eating and herding, of course, posed no or little socio-environmental problems as long as population density was low and grazing land in unlimited supply.

Today those pre-conditions no longer apply. Instead, the world-wide production of some 1.3 billion grain-fed cattle, kept for meat consumption, is recognized to be one of the primary causes for desertification which is tied to four interlinked, environmentally damaging processes: deforestation, over-cultivation and compaction of soil, overgrazing and improper irrigation. Thus, for example, each animal consumes some 900 pounds of vegetation per month and compacts the soil with a pressure of twenty-four pound per square inch. The Worldwatch Institute have produced numerous calculations on the effects of this particular industry. Amongst others, that one pound of beef in the shops equates to 35 pounds of eroded topsoil (Rifkin (1992: 203). Moreover, it is not only the soil that suffers when cattle are raised for beef consumption. Both water and the atmosphere are polluted and degraded thus denied as living and breathing spaces to future generations of beings.

The future taking associated with the American beef culture, furthermore, is unambiguously tied to the frontier spirit. It is connected to the Christian fervour of pilgrims migrating west on the one hand and the utilitarian quest to tame the wilderness and transform nature to human will and desire on the other. Salvation was the long-term goal while the frontier set the task and focused the vision on the immediate future. This meant, suggests Rifkin (1992: 256-7), that 'Americans adopted a wholly new time orientation, becoming a kind of temporal nomad, living only for the morrow'. In other words, the taming of that new world, required and produced men and women that were 'unfettered by tradition or sentiment, unresponsive to past alliances and obligations, cued to the utilitarian needs of the moment'. As such, the frontier spirit chimed well with the modern pursuit of progress, market efficiency and social mobility we discussed in previous chapters.

Similarly, this fusion of perspective, approach and effort maps well onto the Enlightenment view of the world with its stress on utility, rationality, science, mechanisation, economic efficiency and mobility. It produces a coherent perspective to subdue, colonise and conquer in both space and time. With the gaze firmly fixed forward into the promising future, the thrust of actions is one of pioneering adventure and, in some cases such as the colonisation of the American west, combined with religious fervour. For these colonizers action took priority over questioning reflection, daring over historically embedded social concern, the pursuit of efficiency and effectiveness over environmental considerations. As such, the frontier spirit dissolves boundaries, overcomes limits and vastly increases the temporal horizon of human activity and impact.

Clearly, the frontier spirit produces not only tremendous progress and advantages but also dire consequences: species are being wiped out. Aboriginal peoples are oppressed. Pollution, desertification and global warming are on a seemingly unstoppable roll. People the world over are loosing jobs and livelihoods. Entire

[4] According to Rifkin (1992: 2), cattle have always been a medium for exchange and 'one of the oldest forms of mobile wealth'. Moreover, ownership of cattle was tied to power and in India the Vedic word for war means 'desire for cow' (Rifkin 1992: 36).

countries are thrown into spirals of unrepayable debt (George 1989, 1992). Looked at from the perspective of resources, therefore, we can see that the frontier spirit is not just producing futures but also consuming them at an unprecedented rate: futures are eliminated like in the Indian myth where the serpent eats its tail or in Greek mythology where Saturn devours his offspring. Today, Jay Griffiths suggests,

> We have become Saturn, eating our progeny. We have become the very cartoon of creation, picnicking on our own children, not out of anything so grand as fear or self-defence, but out of casual cannibalism…' (Griffiths 1999: 231)

Resource depletion and degradation, moreover, are not the only forms of future taking that accompany so many efforts of future making. The quests for safety, salubrity, security or sustainability often turn out to have opposite effects to those intended. This can be observed, for example, in the development and widespread use of monocultures, in forest clearance for crop production, in large scale water projects to secure irrigation, in the trails of pharmaceutical products, in bio-engineering and in military endeavours. In all these practices the negative effects often exceed the positive intentions: efforts to improve on nature through genetic modification, for example, may result in reduction of bio-diversity and diminished fitness in genetically modified organisms, their futures being imperilled rather than enhanced. Equally, when progress is pursued in the techno-scientific, medical and economic spheres, salubrity may be endangered rather than improved. Similarly, security may be threatened rather than strengthened with military interventions as the recent 'wars on terror' in the Middle East amply demonstrate. Two technologies – plastics and nuclear power - will serve to illustrate the underlying relations between future making and future taking.

> The development of plastics and their subsequent widespread socio-economic distribution has changed our lives beyond recognition. Plastics are manufactured resources that have infiltrated every aspect of modern living. IN addition to their many virtues, their residues are today found everywhere: in water, soil and air, animals, plants and humans, in heavily populated as well as the most remote regions of our earth. As Theo Colborn's seminal research shows, at their inception plastics were hailed to be safe, inert, stable and durable, all characteristics that featured on the positive side of the balance sheet. Yet these very same traits turned out to also constitute their dangers (Colborn et al. 1996)[5].
>
> Very slowly the recognition dawned that plastics were accompanied by time-space distantiated effects that acted as cumulative poisons in the food chain, until today there is no place on earth untouched by their system-invading effects. Moreover, the damaging processes work below the surface, unseen, unfelt and undetected. As such they facilitate a death that 'is slow, invisible and indirect' (Colborn et al. (1996: 147). This means the dangers associated with plastics lack the tangibility, immediacy and drama necessary to galvanise politicians and regulators into action. Like cancers associated with radiation, the unintended consequences of the world-wide permeation of plastic materials are trans-generational hand-me-down poisons. Unlike cancers,

[5] For a secondary analysis of the temporal relations involved, see Adam 1998

> however, the damage is done not at the level of cells but the body's communication systems, which means that the immune, endocrine and nervous systems of all mammals are affected. These poisons are passed on in the womb at critical stages of embryonic development but do not develop into symptoms until the embryos have matured into adults. As such, plastics do not kill but impair health and endanger salubrity across generations. Notably, repair is not possible because the body does not recognise its enemy. By the time the harm is recognised, the attendant massive curtailment of futures is irreversibly set in train.
>
> When we compare the future making and taking associated with plastics with that of nuclear war technology, we find that in the case of nuclear weaponry futures are not merely spoilt or foreshortened but potentially eradicated. With the invention of the nuclear bomb and a stockpile of weapons that has the capacity to eliminate the human race many times over, in other words, continuity can no longer be guaranteed and the potential end has become an ineradicable globalised feature of our present. No longer merely individual, death has become a collective potential that requires collective rather than individualised responses. Moreover, since the knowledge cannot be erased or undone, even disarmament cannot alter the fundamental contemporary condition of the potential end in the present and applies not only to the entire human species but also to vast numbers of other life forms. This means we can no longer take for granted one of the most fundamental human assumptions: that the following generation will carry on where we leave off. With the development of the nuclear bomb, this becomes a misplaced expectation.

In summary we can say that future making, and future taking as its accompanying shadow, are not contemporary phenomena only. Today, however, the nature, quality and scale involved have changed the activities to a point where they are barely comparable to earlier forms.

> Throughout human history, humans have risked the unknown, courting both success and catastrophe. What differs now is the stakes, the magnitude of possible mistakes. Our activities no longer involve just one village and its neighbour, one valley or the next. The scale of human activity means that these experiments engage the planet. (Colborn et al. 1996: 246)

The very characteristics that we eliminate from our designs and bracket from understanding and debate, I suggested, are the features that emerge as contradictions, unintended consequences and unforeseen surprises. As we take charge of our destiny in the short and very long term, we must not forget that we are attempting it with tools that are inappropriate for the task. Transformation entails unintended consequences since all affected elements and threads of an interdependent reality cannot be controlled for. The promethean aspect of power therefore cannot be avoided or eliminated. However, unintended consequences and unwanted effects can be reduced significantly if some of the central problematic approaches to the future are revised.

Futurity Redeemed

To help decrease negative effects and paradoxical consequences of future transforming activities requires that we make changes at a deep structural level of sedimented knowledge and historically established, taken-for-granted meaning. It

necessitates that we reconnect what has come adrift with the modern pursuit of progress and that we dramatically expand our frames of reference in accordance with the potential effects of our actions. Three clusters of issues in particular have arisen in this chapter and will thus focus our attention here in the concluding part: embeddedness and interdependence, connectedness and social memory, processuality and futurity. In all three cases attempts need to be made to redeem to its appropriate place in the future making scheme of things that which had been repressed and bracketed in the public domain of modern life. Understanding the paradoxes, I suggested in the introduction, is an important step towards alternative ways of future making. Thus, when we permit ourselves to be discomfited by the seemingly inevitable contradictions, we are allowing ourselves to perceive openings for change in the interstices between intent and the unforeseen and unwanted impacts we identified above.

Throughout this research we have demonstrated that people are more capable to act than they are able know the effects of their future making. In this paper I showed that our public, professional and institutional lives are characterised by promethean know-how that brackets contextual, temporally extended and embedded knowledge. In addition we suggested in this and a previous paper that modern progress is built on the foundations of Newtonian science principles and that we consequently understand the world in terms of material objects in motion, abstracted from their context and disconnected from their embedded and embodied interdependence. Difficulties arise because the products of progress do not behave according to Newtonian design principles. Rather, they interact with people and their environments, hence problems and perils accompany the successes of modernity. Moreover, in the process of abstraction and fragmentation, we sever connections to the time-space distantiated effects of our actions and fail to appreciate our personal implication in collective decisions, which in turn facilitates against taking responsibility. In a context where processes and relations are no longer embedded in their temporal continuum, I finally argued, future making all too easily slips into future taking. The first corrective move therefore would seem to be an effort to re-embed and re-embody the products of progress in their temporal continuum and understand them as social. This would mean that we re-contextualise our products of progress and our technological projects and know them as living and proto-living social things[6]. This issue will be revisited in the next paper, *Futures Traversed*, where it is going to be addressed in greater detail.

A second move would encompass the re-activation of social memory in contexts where this is explicitly and comprehensively excluded, that is, where projects have been severed from past interdependencies, collective experience, collective memory and ancient chains of obligations. This would apply to the professional world of science and business and to the short-term operational realm of politics, for example, where social amnesia reigns supreme. The shift in perspective would require that we know ourselves and our actions in their historical context and extend our framework of concern across generations to encompass time-scales that are appropriate to the decisions and action in question. Thus, for example, for action at the nano-level we would need to allow ourselves to be troubled by a) our lack of understanding of the

[6] By' proto-living social things' we mean technological objects that become absorbed into our everyday lives where they constitute in integral part of the socio-cultural fabric of contemporary existence. Plastics, electricity, cars and computers, for example, are all pertinent illustrations of 'proto-living social things'.

significance of our actions and their interactive effects at that level of reality and b) by our ignorance about its rippling through other material, spatial and temporal levels of existence. Similarly, for action concerning nuclear material or genetically modified organisms, we would need to connect our temporal frames of concern to the time scale of potential effects, thus make them appropriate to the materials in question. If thousands of potential generations of grandchildren are implicated in the effects of our future making then we need to ask first, whether or not these potential loved ones would want to be bequeathed this particular blessing with its attendant perils and secondly, what structures we would need to put in place to provide *them* with the wherewithal to deal with our products of progress once these have turned into legacies of peril. Far more attention than is given at present would need to be spent on devising structures that connect our present to theirs in a seamless web of trans-generational communication and care[7].

Everything connects to everything else in a network of material, spatial and temporal interdependencies that encompass not just human beings but communities of animals, plants and inorganic matter, that is, all that exists on this earth and beyond. This is the core of an ecological understanding the world. As such it constitutes an alternative form of knowledge to the one that abstracts, decontextualises and fragments as a precondition to action. While the latter is concerned to make distinctions and to separate realms, the former seeks their connections and interdependencies, their coherence and unity. It is the ecological mode of knowing that has been so meticulously airbrushed from the frameworks of meaning that underpin the industrial way of life. It is these very connections and interdependencies that have been denied, which today re-surface in the unintended and unwanted consequences of the carefully planned and executed projects in pursuit of progress. To lessen those unwanted outcomes and implications we would do well to re-connect what has been separated in the cause of scientific development: people, technology and the environment; mind and matter; socio-cultural wisdom and the public quest for progress; economic pursuit of profit and social chains of obligation, care and responsibility; the timescale of resource use and the timescale of depletion, as well as future oriented action, knowledge and ethics, to name just some of the more prominent disconnections we touched upon in this chapter. If we shift emphasis from efforts to isolate and abstract to endeavours to connect and relate, we will be able to recognise our implication in the fortunes and disasters of unknown others the world over. Such a shift in perspective would enable us to connect our choices of food, transport, leisure, insurance, banking and modes of saving, for example, to the drought in Ethiopia and other parts of Africa, to the debt crisis in the majority world and the economic collapse of entire countries in the East and Eastern Europe, to the wars in the Middle East, to the opium trade across the world or to the floods in Bangladesh and other low-lying built-up areas.

Similarly, when we expand the temporal framework of analysis and concern and connect what is so carefully preserved in separate compartments and administered in disconnected institutions, then future making and future taking are seen in a different way. We realize that progress is always achieved at the expense of someone else. From such an expanded temporal perspective we could then begin to ask appropriate

[7] Current efforts in US to find communicative means to send messages of danger across a period of at least ten thousand years are still being pursued, see research by the *Rosetta Project*, via the *Long Now Foundation* (www.longnow.org)

social questions: knowledge for whom or what? Who is likely to benefit, who to lose out? Moreover, in contexts where, due to the immense complexity of the processes and the time-space distantiation of effects involved, we lack scientific evidence to provide appropriate predictions about potential outcomes, evidence-based knowledge can no longer serve as justification for action or inaction. Instead, socio-cultural wisdom, values and ethics need to form the base for decisions that affect present and future collectives. This in turn concentrates the mind on questions about responsibility: who and what are we responsible *for*? Who are we responsible *to*? And how far into the future do these responsibilities extend? Neither politicians, nor economists or scientists are in a position to seek answers to these questions. This is an inescapably collective task.

Through the global commitment to sustainability, with its insistence that we cannot and must not separate the social from the economic and the environmental dimension of our actions, a start has been made to re-direct socio-cultural processes and project in the direction of understanding connections and interdependencies. However, as long as the underpinning analysis is primarily rooted in spatial and material frames of meaning the good intentions cannot be brought to fruition. Once more, Hannah Arendt's work is helpful to draw out some of the connections. Human affairs, Arendt (1998/1958: 183) insists, exist in webs of relationships. In distinction to the fabrication of things, action is not possible in isolation. Action is a temporally extended process and its products too are interactive, ongoing, boundless. Thus, Arendt (1998/1958: 190) suggests, 'the smallest act in the most limited circumstances bears the seed of the same boundlessness, because one deed, and sometimes one word, suffices to change every constellation'. Thus, it is our capacity to act which produces processes that are irreducibly uncertain and unpredictable in their outcomes and this applies whether we act socially or fabricate things that are used socially in the way I explained above. When we therefore seek to understand those social and socio-technical processes with the conceptual tools required for fabrication, that is, for material production, we fundamentally miss the point. We make a category mistake that will inevitably lead to faulty analysis.

In our efforts to transform the future not just in a more predictable but also in a more responsible way, we need to complement Arendt's analysis with a temporal perspective that re-connects future oriented action, knowledge and ethics. Let us re-cap: fabrication produces material objects whose potential outcomes can be predicted in the present, based on knowledge of the past. This means that all that lies between the creative action and its time-space distantiated effects remains not just invisible but is considered unreal from the knowledge framework of fabrication. If, however, we want to connect products to their potential impacts then the latent form needs to become an integral part of our understanding. To achieve this incorporation, we need to distinguish between the potential future *product* and the encoded *futurity* that permeates the present and foreshadows the future in the processes that are already in progress. The decoding of this encoded futurity, however, cannot be achieved by prediction on the basis of a material past. It requires instead a shift in perspective from product as result to product as process, that is, as ongoing becoming. When we thus connect matter, space and time, then the futurity of organisms in general and of human beings and their projects in particular is redeemed. And, once futurity is reclaimed, we can find ways to connect responsibly to the time-space distantiated

impacts of our actions and make the time scale of concern appropriate to the magnitude of our deeds together with their potential effects.

Reflections

Transformation is about control, about seeking to impose one's will on the world. Transformation of the future is about seeking to change what is assumed would have been there had no interference taken place. The technologies identified in this chapter are not just about taming or shaping the future, they are explicitly about transforming it. All are conceived as 'improvements' on nature. All fundamentally alter the present and future shape of things. The capacity to abstract and render static what is fundamentally ephemeral, moving and interacting has had tremendous advantages for *understanding* our world. For the quest to alter and *transform* an interactive, interdependent world, however, the abstract mode of knowing has turned out to be a tremendous disadvantage. It is the wrong conceptual tool for the job since, to insert creations conceived in the abstracting mode of knowledge into an ecological environment of give-and-take that extends from the beginning to the end of time is bound to result in unintended and unwanted consequences. To achieve such desired futures requires of transformers a thoroughly temporal and ecological mode of knowledge and operation. That mode however, alters not just how we transform the future but it also fundamentally shifts our understanding of what we consider important, relevant and justifiable.

References

Adam 1998 *Timescapes of Modernity. The Environment and Invisible Hazards.* London: Routledge.

Adam, B 2000 'The Temporal Gaze: Challenge for Social Theory in the Context of GM Food', Millennium Issue *BJS* 51/1:125 – 142.

Adam, B. 2004 *Time.* Cambridge and Malden, MA: Polity

Arendt, H. 1998/1958 *The Human Condition.* Chicago: Chicago UP

Berman, M 1982 *All that is Solid Melts into Air. The Experience of Modernity.* London: Verso

Colborn, T. et al. 1996 *Our Stolen Future.* Boston: Little, Brown and Company

DEMOS/ESRC *Nanoscientists Meet Nanopublics* DVD

Eagle Alliance website: http://www.eaglealliance.org/ & http://www.vanderbilt.edu/radsafe/9611/msg00220.html

Ecologist 2006 June 4, pp 41 – 57.

Ferguson, D. 2000 *The History of Myths Retold.* London: Chancellor Press.

Flannery, T F 1994 *The Future Eaters. An Ecological History of the Australian Lands and People.* Sidney: Reed Books.

George, S 1989 *A Fate Worse than Debt*, Harmondsworth: Penguin,

George, S 1992 *The Debt Boomerang*, London: Pluto Press,

Griffiths, J 1999 *Pip Pip. A Sideways Look at Time.* London: Harper Collins.

Kearns, M, McNaghten, P and Wilson, J 2006 *Governing at the Nano Scale: People, Policies and Emerging Technologies*. London: Demos

Latour, B 1993 *We have never been Modern.* Translation Catherine Porter. New York: Harvester Wheatsheaf.

Latour, B 2004 *The Politics of Nature.* Translation Catherine Porter. Harvard: Harvard UP.

Littleton, S. C., ed. 2002 *Mythology. The Illustrated Anthology of World Myth and Storytelling.* London: Duncan Baird.

www.longnow.org

Marx, K 1977/1856 "Speech at the Anniversary of the *People's Paper*." Extracted in McLellan, D *Karl Marx. Selected Writings.* Oxford: Oxford UP pp. 338 – 339.

Morgan, O 2006 'Nuclear Costs to Hit £90Bn Warns Brown' *Observer* 4 June 2006.

Open Democracy www.opendemocracy.net/globalization/climate change debate/2587.jsp

Pimentel, D 1993 *World Soil Erosion and Conservation.* Cambridge

Pimentel, D. et al. 1995 'Environmental and Economic Costs of Soil Erosion and Conservation Benefits' *Science* 267: 1117-1123.

Rifkin, J. 1992 *Beyond Beef. The Rise and Fall of the Cattle Culture,* London: Thorsons / Harper Collins.

Rosettaproject.org

Sabelis, I H J 2001 *Managers' Times. A Study of Times in the Work and Life of Top Managers*

Weber, M (1989/1904-5) *The Protestant Ethic and the Spirit of Capitalism.* Transl. T. Parsons. Intro. A. Giddens, London: Unwin Hyman.