

MEMORY OF FUTURES*

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Biographical Note

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Abstract

We think of memories as being focused on the past. However, our ability to move freely in the temporal realm of past, present and future is far more complex and sophisticated than commonsense would suggest. In this paper I am concerned with our capacity to produce and extend ourselves into the far future, for example through nuclear power or the genetic modification of food, on the one hand, and our inability to know the potential, diverse and multiple outcomes of this technologically constituted futurity, on the other. I focus on this discrepancy in order to explore what conceptual tools are available to us to take account of long-term futures produced by the industrial way of life. And I identify some historical approaches to the future on the assumption that the past may well hold vital clues for today's dilemma, hence my proposal to engage in 'memory of futures'. I conclude by considering the potential of 'memory aids for the future' as a means to better encompass in contemporary concerns the long-term futures of our making.

Introduction: Production of futures

As human beings we have the ability to move in space and time. For both spheres, technological aids have vastly enhanced and expanded the capacity for this mobility. For the mobility in time, memory and projection, retention and protention are inseparably intertwined and neither is possible without the other. Yet the two temporal extensions are not equivalent: our ever-increasing ability to know the past is not matched by a parallel

capacity to know the future. Moreover, the conceptual and scientific tools at our disposal to achieve knowledge of the future that is appropriate to the temporal depth of futures produced in practice are woefully inadequate. It is this discrepancy that is at issue in this paper.

The creation of the future is what makes us human. It is the mark of culture. From earliest burial rituals to megalithic temples and today's products of technology, futures have been produced as a means to escape our biology. This quest for transcendence of the earthly condition first arises with the knowledge of individual finitude. One way to achieve existence beyond death is to posit a world of eternal life, a spirit world of origin and destiny from whence we came and return to after death. Another is to create islands of permanence in the sea change: through rituals and myths, symbols and externalised communications, art and artefacts, rules, traditions and institutions. Another still is to extend the present, that is, to borrow from the future for the benefit of individual and social life now. The time scales involved have always been ambitious. They ranged from forever more in the realm of the ancestral netherworld to the time of granite, from the hero's life told in legend and song to the sacred world of immortalised understanding in underground caves, from the preservation of the soul for the afterlife to the quest for nirvana, from the techno-future of print to the half-life of plutonium and the open future of genetically modified organismsⁱ.

Industrial societies have extensively colonised the future as a means to counter not just finitude but also the uncertainty that accompanies existence unto death. Safety, salubrity, security, solvency, stability, success and sustainability seem to be the motivating forces for their forays into the future. By bringing the future into the present, uncertainty got

tempered, transformed into a risk factor that could be calculated and managed on the basis of a known past. Science and economics were the tools through which this reigning in of the uncontrollable has been accomplished until, that is, the outcomes outgrew the tools of their creation and the consequences outstripped the capacity to absorb the unintended negative effects. The power to affect the future turned out to be far greater than the capacity to imagine and know it.

This gulf between the ability to have long-term effects and the radical inability to accompany our actions to their eventual destinations is the central concern of this paper. In the endeavour to close the gap I scrutinise some of the conceptual tools at our disposal to deal with this travesty and, more generally, search for paths that guide us towards more appropriate means to take responsibility for the futures of our making. This involves processes I would like to call ‘memory of futures’ and encompasses attempts to enrol forgotten traditions for entirely new purposes.

Identification of the Problem

Gap between production of futures and forethought

To fully appreciate the problem I draw on examples from technological futures. Those that best illustrate the disjuncture between the ability to act and knowledge about potential outcomes include electronic communication, nuclear power, genetic engineering and, most recently, nano-technology. All can be considered major successes of the industrial age, all have contributed significantly to the socio-economic and cultural progress of industrial societies and their rise to global dominance. In each case, however, the coveted successes are linked to unforeseen problems, which our societies seem

singularly ill-equipped to deal with. This applies whether we focus on the electronically organised monetary system with its run-away financial markets and its unpredicted collapses of banks, pension funds and insurance companies or whether we are concerned with the long-term unchecked, uncontrolled and uncontrollable radiation from nuclear installations, test sites and accidents.

The success-problem axis is clearly discernible when we attend to deliberations of proponents, opponents or regulators of genetically modified food or the debates on cloning and tissue engineering from a scientific, political, economic, or religious perspective. Battle lines are drawn across these techno-spheres, which produce long-term and often open-ended futures. Proponents stress the benefits to present and future generations, the promise and progress through the advance in knowledge. They emphasise the collective duty not only to rise to the challenge of creating alternative futures, but also to fulfil our destiny to subdue nature. Opponents, in contrast, underline associated uncertainties, risks, dangers and social devastation, both actual and potential, that are wreaked by these enterprises. They argue that the scale of unintended polluting outcomes is such that it exceeds the sink capacity of our earth. They counteract the utopian enthusiasm of proponents with prophecies of doom and gloom about unforeseen and unforeseeable health problems. They warn of the dangers of applying technological fixes to problems caused by technology. They see hazards, hunger and human tragedy where proponents expect pre-eminence, progress and profit.

Despite their irreconcilable stances regarding the various future-constructing inventions, however, proponents and opponents of technological progress share some taken-for-granted assumptions. These are rooted in the Enlightenment thought tradition, which

underpins positivist science, classical economics and liberal democracy. They involve location in the present, the Derridian ‘metaphysics of the present’, and a perspective on the future as external to and separate from the present. It is very likely that this shared knowledge base is implicated in the inability of both proponents and opponents of techno-futures to bridge the gap between action and knowledge of impacts. As unquestioned and unquestionable habits of mind, I want to argue, tacit assumptions are brought to bear on the contested issues, and delimit the potential range of available alternative visions. Given that these taken-for-granted premises constitute invisible barriers to knowledge practices that might otherwise close the knowledge gap addressed in this paper, they need to be surfaced, explicated and renewed as precondition to an ethics of responsibility that is adequate to and appropriate for the contemporary condition.

Habits of mind: scientific, economic and democratic

The contemporary operational realm of human action extends into a very long-term, open future. With this expansion of reach it is no longer appropriate to think and act with reference to neighbours and contemporaries, kin and the next generation. Since, moreover, our contemporary technological capacity impacts on nature in a new way – changing the balance of its forces, its regenerative power and its evolution, for example – our sphere of responsibility has to be expanded so as to match the realm of human influence in both time and space. It has to transcend the human realm and encompass nature and the universe. It has to reach beyond the present to the techno-future of our making. It has to embrace not just next of kin but generations of potential successors as far into future as our actions extend. The changed socio-technical conditions of contemporary industrial societies present new socio-political challenges that are rooted

in the gap between the power to act and the capacity to know, and are primarily centred on the moral requirement to accompany our actions to their eventual outcomes, that is, to ensure that *responsibility becomes adequate to the sphere of influence*. As I indicated in the introduction, however, we seem to lack the knowledge and conceptual capacity to know the future in a way that is appropriate to the temporal depth of our actions. To address the gap, therefore, we need to look more closely at this knowledge base and its institutional spheres of application.

Let us begin by focusing on industrial societies' knowledge base which is predominantly founded on the triad of science, economics and the politics of liberal democracy.

Scientific knowledge in the classical (Newtonian) mode is established around materialist, objective knowledge, causal analysis and a positivist methodology. It is knowledge of a world of physical objects in motion. For more than two hundred years this perspective on reality had been perceived truth for natural scientists (and the scientists of other disciplines who emulated them) until, during the early twentieth century, a more relativist understanding started to unsettle the hitherto unquestioned belief in a quantifiable material world of moving objects and began to posit a physical reality was neither accessible to the senses nor amenable to objective and verifiable measurement.

What continued largely unchallenged, however, was the belief that, with the exclusion of the quantum level, events are governed by the laws of cause and effects, that all motion has preceding causes, and that therefore the past is source of all knowledge of the present and ground for projected and predicted futures. This meant that scientific truth and foresight continued to be established on the secure basis of a known past.

Belief in causality, however, delimits scientific expertise with regard to *outcomes* of innovative science and its technological applications, which are rarely amenable to knowledge extrapolated from the past. The scientific *production* of the future, in form of technological innovations, it seems, stands in an inverse relation to the capacity *to know* the scientific creations with all their potential consequences. That is to say, the techno-scientific ability to produce futures is not matched by scientific knowledge of futures thus created. This raises the spectre of structural irresponsibility at the very core of science: for the translation of scientific knowledge into products and for the scientific guidance that underpins inter/national regulation and politics.

It is precisely this form of science, we need to appreciate, which is relied on to guide political practice and decision-making processes. Scientific evidence (rooted in a known past) is regularly called upon by political decision makers to arbitrate between opposing views and positions, be this at the local, national and international level of policy.

Difficulties clearly arise when traditional science is to arbitrate in situations of uncertainty where there is no past precedent from which the future could be projected with reasonable measure of certainty. In such situations scientific experts tend to disagree with each other and their predictions invariably fail. Examples would be cases where scientific evidence was relied upon to assist the political process with policies on radiation and public health, the safety of genetically modified food or nano-technology products, with licences for biomedical patents and medicines, as well as international regulations governing chemical compounds, herbicides and pesticides.

The stereotype of scientific knowledge is of course not adhered to when scientists perform their craft and translate their knowledge into scientific practice. For science in

practice tends to combine the rational pursuit of the scientific ideal with imagination and intuitions as well as hunches grounded in embodied knowledge, without giving much thought to the matter. This is so because much of human futurity is not of the kind that can be extrapolated from a known past. Rather, it is open-ended, rooted in being unto death and irreducibly tied to human freedom. Our futurity, in other words, is marked by anticipation, fear, hope and desire; by the capacity to use our imagination, calculate and speculate, plan and make choices; by entering contracts, honouring obligations, taking responsibility and acting on trust; by being guided by ideals, passions and ambitions as well as ethics, morals, faith and visions of how the world ought to be. In everyday life, it seems, people (including scientists) bracket past-based causality, casting aside its restrictions by living futurity and practicing protention. In their daily lives people extend themselves without difficulty towards their potentially real futures for which there are no precedents to provide them with certainty: bringing up children, tending to the garden, taking a flutter on the stock-market, protesting about the animal welfare or the war in Iraq.

Classical economics is the second element of the triad of industrial societies' taken-for-granted habits of mind at issue here. Its knowledge base too encompasses very distinct assumptions about the future that inform and guide not just business and finance but also political decisions. The economic future is equated with money. It is calculated with reference to credit and debt, profit and loss and with regard to risks that are to be balanced out and averted. As an economic resource the future is traded, managed and controlled like any other resource. It is commodified. Costs and benefits of specific futures are established with reference to their utility for the present. In order for its present value to be established, the future is discounted. This entails calculating its utility

value from the standpoint of the present with the result that the value of an event or product decreases with its temporal distance. From this utilitarian present orientation the future is exploited at the expense of successors' presents, life chances and future potentialⁱⁱ.

Neither this economic borrowing from the future for the benefit of the present, nor the past-orientation of evidence-based science bode well for closing the gap between the power to act on the one hand and knowledge of potential outcomes on the other. Neither discipline's approach to the future provides a conceptual base upon which responsibility could be established for eventual and potential long-term impacts of those future-creating actions. The question is whether or not liberal democratic politics, the third element of the knowledge triad, is better placed to achieve this task.

Liberal democracies tend to delimit periods of government on average to four or five years. The policies and regulations established by elected representatives during their time in office, however, are usually intended for much longer periods. Decisions made today about nuclear, chemical and biological technologies, for example, will outlast them not just by decades but millennia. Thus, when risks and hazards, created within the jurisdictional time-space of a particular liberal democracy, transcend those boundaries, the impact is in effect externalised: to other nations and/or to successor generations. The problem is shunted along, moved outside the sphere of responsibility. This means the effects of policies are not just experienced by the voters, their children and their children's children, but by an open-ended chain of generations without vote, voice or advocates to speak for them. In the absence of any higher time-space authority, hazards externalised in time and space are no longer recognised in principle as the concern of the

offending nation's representative government in office. The policies pursued by contemporary liberal democracies, therefore, transgress not only the spatial but also the temporal boundaries of their political mandates and realms of jurisdiction. Furthermore, since elected representatives are responsible to their electorate only, and since it is this electorate that bestows legitimacy on a government, the rights of future and distant people who cannot enact that power relation are 'discounted' in a way that is analogous to the discounting of the future in economic processes. The effects of the two discounting practices seem to be the same: the further away the potential hazards or degradations, the less they count for considerations in the present.

If the democratic deficit at the very core of liberal democratic politics is the first problem regarding the gap between the production of the future and responsible forethought, the second relates to the knowledge base upon which decisions are made: scientific knowledge is the unquestioned source of evidence, economics the taken-for-granted justification for decisions. Yet, as I have suggested above, science and economics are inappropriate sources of knowledge for responsible political engagement with the future. Neither provides suitable conceptual tools with which to be mindful of potential outcomes of economic and scientific actions. This choice of inappropriate knowledge base for approaching futures of our making is to occupy us for much of the remainder of this paper.

Knowledge Practices Focused on the Future

In this part of the paper we are concerned with tacit assumptions that underpin the dominant knowledge base of industrial societies, that subtly guide actions and delimit

what is possible and conceivable. These assumptions act as barriers that work silently below the surface, unseen and unquestioned, because they have become naturalised as facts of daily life. Once these invisibles are raised to the surface and rendered visible they can be opened up to scrutiny and become subject to public debate. De-naturalised they are transformed from habits of mind to conceptual tools. As such they can be brought up to date with already unfolding processes, with deeds already underway and changed in service of a responsible ethic for futures of our making.

Causal analysis and teleological explanation

How we *relate* to the future is tied to our *understanding* of the future and how the connection to the past is conceptualised. We can think of the future as arising from the past, as a continuation of what has been. Alternatively, we can think of it as a goal or end towards which things and processes are developing. The social scientist and phenomenologist Alfred Schutz (1971) explained the difference between the two causes along the following lines: when we give ‘because’ explanations we refer to the past and preceding events, which we retrospectively rationalise as causes for our actions. When in contrast we give ‘in-order-to’ explanations, we refer to the future and our plans, values and desires as purposes and thus reasons for actions. Both, he argued, are valid ways to account for our behaviour but they draw on different cognitive resources, are located in and oriented towards different temporal spheres, and differ greatly in their accessibility to empirical investigation. Moreover, these two irreducibly different ways of understanding the relation between things and processes have implications for our capacity to extend ourselves into the future; it is these I want to explore below. First, however, I briefly need to outline the difference between past and future oriented causation.

A cause binds events into significant relations. Through the construction of causal chains we create coherence. Thus, when we want to know about any event we implicitly ask for causes: How did the accident happen? How is it going to affect us? For explanations to these and questions like them, we would look for event chains that are linked in some necessary fashion in a move from the present to the past, to the future and back again. The preceding events (that is, the past) would hold the clues to events in the present and the future. Our contemporary western thought world and understanding are inextricably bound to the thinking in causal terms. Equally, our languages are permeated by words that assume a causal relation between events: to produce, determine, affect, bring about and generate are just a few of the more pertinent examples. Causal thinking, I want to assert, is a central pillar of contemporary western understanding of how the world works.

Not surprisingly, therefore, it is just as influential in the disciplines charged to explain this world. In psychology Freud looked toward the past to explain the present, seeking to unravel the causal chains that led to current afflictions. Treatment involved recovery of the repressed and its cathartic release. In the social sciences, Emile Durkheim and Max Weber demanded causal adequacy for all social explanations. Durkheim wanted us to understand the genesis of social processes, to trace them backwards and explore them through preceding causes. Weber insisted that causal explanation had to be provided alongside interpretations of the meanings involved. All three theorists grasped that scientific explanation was causal, that the present and future arising from the past was the scientific way of understanding temporal relations. As scientists, in other words, they could not evade causal explanation. They understood further that our ability to know the

present on the one hand, and to make predictions, forecasts and inductive inferences about the future on the other, crucially depended on knowledge of past-based causation.

The imagery associated with this causation by prior events is of a future created by a *push from the past*. This thought tradition, which dominated understanding for the past 300 years, had been preceded by modes of understanding the future that differed significantly from this scientific way. The teleological perspective on the future held that any meaningful explanation of activity needed to involve conceptions of purpose. It was not just concerned with *how* something occurred but *why* it did so and *what* it was *for*. Whenever we address the question ‘why?’ we are in the human realm of purposes and plans, of goals, ends, ideals, values, ethics and morals. Moreover, with a teleological perspective on causation we are implicitly acknowledging human freedom, that people orient towards their beliefs and values and that these involve the element of choice. We can think of this purposive causation as a *pull from the future* that influences actions in the present. This perspective on the future involves beings with minds and motives that orient towards imagined futures that have yet to be realized.

Teleological explanations have a long history reaching back to Greek antiquity. *Telos* is Greek for end, goal, task, purpose or perfection, teleology the study of such ends.

Aristotle gave teleological explanations his most detailed attention. As part of this work, he identified four types of causes: material, efficient, formal and final. In each of these the future featured to varying degrees. It was absent in the material cause, which refers to the physical source of something, barely present in the efficient cause, which he defined as the initial impulse that started the process. In the formal cause, which is the idea or the blueprint that shapes a thing, the future features as preceding plan. However, the

most notable role for the future was reserved for the final cause, which Aristotle saw as the goal or end for the sake of which an action was taken, and which thus guided the process. Aristotle understood the final cause as internal governing principle that applied to both human action and physical/material change. To explain any coming into being, therefore, required reference to all four causes.

Teleology also played a major role in religious beliefs and practices. With Christianity, for example, final causes took on a new guise. Our world of purpose and goal-directedness was believed to point to a beneficent, omnipresent, all-powerful creator God, a God who designed the world to fulfil its god-given nature. In other words, a universe that shows signs of design and purpose provided numerous indicators for the existence of a god. As designer of the universe this god determines our destiny. Our soul, the immortal part of mortal existence, is oriented to its final destination, its journey through the transitory state of earthly existence guided by its spiritual goal. The influence, however, is never one of pre-determination. Rather, the human condition of free will forces us to make choices along this path to the spiritual realm of eternity.

Karl Marx was the social scientist most explicitly concerned with how the world ought to be, after first having understood the causal relations that brought about a state of affairs he designated socially unjust and in need of change towards more equitable social relations. He provided a utopian vision that brought the future within human reach. Collective action and the application of science were the means to achieve the social goal. In Marx's teleology the belief in progress and the perfectability of the human condition were still untainted. Despite his acknowledgement of the potential dangers of

technology, his faith in its power to deliver the desired reduction of toil remained firm: it was up to owners, designers and operators to put technology to appropriate use.

In the biological sciences Darwin's evolutionary theory fundamentally changed the way cause was understood in nature. Evolutionary theory dispensed with both the idea of a designer God and with Aristotle's formal and final causes. It solved the problem of forms and ends in nature by focusing on the function of parts within wholes. Darwin explained the teleological character of the world in non-teleological terms, as evolution giving rise to functionally organised systems and intentional agents. In the life sciences, therefore, teleological explanations appear in the guise of ascriptions of functions to parts embedded in larger wholes: organs in bodies, bees in hives, individuals and groups in species. In the late 19th and early 20th centuries these functional teleological explanations were taken up in the social sciences to explain the role of individuals for the maintenance of social structure and order. Overall, however, we can observe that with the rise of science to dominant knowledge the scope of teleological explanations decreased whilst causal explanations were being naturalised as norm.

To recap, then, in teleological explanation the emphasis is not merely on how the world *is* but on how it *might be* or *ought to be*. It answers to the question 'why'? It entails a conception of goals, ends and purposes, of planning and a planner, of design and a designer. It acknowledges that, even if a planned event does not happen, it is nevertheless influenced by that future vision, purpose or intent. Despite its evident importance for social life, that form of teleological explanation was considered out of bounds as far as traditional science is concerned, with only its functionalist version being retained. Questions about morals, ethics, values, the good and the just have been

positioned outside the boundary of legitimate scientific enquiry. Only the past became eligible as both source and path to truth on the one hand, and to knowledge about the future on the other. Given that in today's industrial societies science is the dominant source of evidence-based knowledge and economics the justification for action, as I have argued above, this poses problems when we want to present the case for a long-term perspective on the social production of the future: be this for ecological considerations, spiritual concerns or the rights of future generations. To take account of eventual outcomes of today's future producing actions, I want to argue, necessitates that we develop an appropriate modern form of teleological explanation, a new teleology that can provide a sound basis for socially responsible relations to the futures of our making.

Material reality and the virtual real

Materialism, the next issues under consideration, relates to the understanding of the real, the emphasis on matter and the reliance on quantification. Today this particular understanding of reality is applied in a context where much of the socio-economic relations and productions are no longer encompassed by the materialism of old. To understand the depths of the problems involved, we have to return briefly to the stereotypical conception of science. In the conventional natural sciences, as I have indicated above, reality pertains exclusively to the material world. All things physical are real: matter, objects, things, the stuff that bumps into each other and produces movement, the world that is connected by causal relations, all that is accessible to our senses and scientific measurement. From a materialist perspective therefore the future is unreal. It has none of the qualities that are defined as real under the materialist episteme. And yet...

Nuclear radiation, for example, works unseen and largely unmeasured, silently and invisibly beyond the reach of our senses at the level of cells, without being clearly connectable to its causes. Similarly, some of the chemical processes operate in the realm of the 'unreal real' with effects emerging as problems in mammals' reproductive capacity, one and more generations down the line, somewhere along the food chain. As far as genetically modified plants are concerned, there is as yet little of those un/real processes and effects to report, apart from the monarch butterfly and a few plant species that have begun to hybridiseⁱⁱⁱ.

In a parallel world of economic and monetary activity, in the meantime, futures are traded on financial markets where fortunes are made on this particular 'immaterial unreal,' or is it 'material unreal' or 'immaterial real'? The fact that it is difficult to know how to define that reality within the conventional framework of materialism, give us an indication about the inappropriateness of the perspective. In the realm of electronic communications viruses of the unreal kind stalk real internet communications, infecting healthy software and bringing down entire communication systems. Clearly, the conventional definition of the material real and its association with sense data, measurement and quantification is no longer appropriate to the contemporary condition. The 'real' has mutated while the conceptual tools are stuck in a previous age. Steeped in the narrow, materialist conception of reality, we remain impervious to the im/materiality of the contemporary world of our making. This mismatch between conceptual tools and the contemporary im/materiality has the effect that we demand proof for things we cannot see, touch, taste, smell or hear, and insist on mapping material relations for processes that operate on a different plane, creating effects in different times and places without visible and/or traceable connections.

The concept of ‘the virtual’ could come to the rescue here^{iv}. The Oxford English Dictionary defines the virtual as ‘that [which] is so in essence or effect, although not formally or actually’. This definition would allow for the intangible, latent, im/material quality of some of the contemporary techno-processes that are not accessible to the senses and evade scientific detection until effects and symptoms arise somewhere, some time in the future. On the basis of this definition, the virtual could allow for their ‘reality’ status, although it would have to be redefined along non-materialistic lines.

It would be vital, however, to sever the virtual’s association with the ‘imaginary’ on the one hand and with the ‘immediate future’ on the other. This would be necessary since both linkages weaken the concept’s potential for handling the ‘unreal real’, best represented as un/real and the ‘immaterial material’, best represented as im/material. Most important, however, for our purposes, would be the need to distance the virtual from its identification with the world of hypermedia, given that the strong association there with simulation, illusion and de-territorialised space would destroy the concept’s potential to challenge the dominant econo-scientific materialism and metaphysics of the present. The hypermedia connection clearly reduces the attraction of the virtual as a conceptual tool with the capacity to denote an alternative *real presence* that is im/material, in/visible, absent and latent, thus irreducible temporal. In contrast to the virtual of the world of information technology, the virtual as defined in the Oxford English Dictionary allows us to proclaim the produced but not yet knowable future to be *real*, thus providing a potential first scaffold upon which to erect a political structure of responsibility for the techno-futures of our making.

Spatial politics and chronopolis

At a more practical level we can observe that, to date, the politics of liberal democracies continue to be oriented towards space (that is, territories extending from regions and nations to the globe) whilst in the world of trans-national business and finance, politics by alternative means are conducted in and with time. Millions of dollars are made every second world-wide in the interstices between time zones, on options, derivatives and futures that do not yet and may never exist as material ‘goods’ in the conventional sense. The whole world in the present is the operational realm of trans-national companies and institutions freed from particular territories and the time-space distanced effects of their processes and products. Their temporal domain is real time and the open future. This future, in turn, is treated as a resource to be commodified and a territory to be colonised. With new elites operating unencumbered in the extraterrestrial, im/material realm of the virtual real, the locally and nationally bound are left to pick up the material pieces: the damage to communities and the environment into an open future. Zygmunt Bauman (1998: 8) writes about ‘the great war of independence from space’ which frees the winners of that war from territorially based legal constraints, from being held accountable for the consequences of their actions, from obligations and duties to local communities and daily life, and from responsibility for the long-term effects of their parasitic actions. This particular responsibility gap too requires attention to the habits of mind that are out of sync with contemporary practices.

The conventional space orientation of Liberal Democracies is closely tied up with the scientific materialism discussed above: things in space are real. Material objects that can be traded and quantified are real. Territories, people, institutions, traffic, crime, budgets and Gross National Products – all can be counted and measured. They are quantifiable.

However, when the impacts of the econo-political decisions extend into open futures, the reliance on materialism and quantification becomes inoperable. To take account of the future is to encompass the unknown and the unknown is not quantifiable, therefore not real. And yet, despite this obvious difficulty, the tradition of quantification is taken for granted. Quantification is a precondition to most environmental regulation, guidelines, taxation, and legal definitions. When the processes involved are time-space distanced and marked by contingency, time-lags and periods of invisibility, or when they are so drawn out that their beginnings and ends, their inception and effects, can no longer be held together (neither in theory nor in practice), then the quest for quantification of the problem becomes futile^v. Both quantification and causal analysis lose their pertinence. In contexts of im/materiality, latency and the virtual real they become inappropriate conceptual tools for political action. Instead, the materialist perspective can only demonstrate ever more sharply the uncertainty of the future for societies wed to the industrial way of life and for all other societies implicated in the effects of that particular socio-political system.

In response to these inappropriate political habits of mind, Saulo Cwerner (2000) developed the concept of chronopolitanism as both a conceptual and ethical tool. 'It is a move', Cwerner (2000:331) explains, 'that has the explicit aim of extending social and political responsibilities to past, present and future generations, as well as to the diversity of histories and rhythms of life that co-exist in the global present'. His work points to inequalities arising from the taken-for-granted, thus un-debated politics of time in general and the future in particular. He asks for a time-based *polis* and citizenship that transcends current international political processes and suggests, that

...the chronopolitan ideal is mindful of the rights of future generations. These rights are already inscribed in the actions and thoughts of the living, in that present actions extend temporally to various times in the future... The memory of previous colonizing enterprises must be allowed to warn us about the power of present generations over defenceless, voiceless future ones. (Cwerner 2000: 337)

What Cwerner is therefore proposing, it seems to me, is an exercise in memory of futures where we remember past visions of the future and accompany their effects into our present. Practice in such empathic memory and imagination may turn out to be an important pre-condition for extending knowledge into our present future in order to accompany potential effects and future oppressions of our making to their destinies. In summary we can therefore say, that the intangible realm of time and especially the future poses problems for Liberal Democracies' materialist knowledge base. Given, however, that futures are created now by scientific, technological, economic and military means, they are *de facto* part of socio-political life and thus need to be explicitly incorporated into socio-political structures and socio-economic processes.

Memory of Futures

Looking back over the issues raised in this paper, it strikes me that there is much conceptual recovery work to be done. Memories of past practices need to be activated to aid the process of making connections whilst moving into new directions. Past knowledge spheres need to be explored, their treasures re-discovered to be adapted for new contexts and contemporary use. A whole raft of currently dominant scientific and economic habits of mind requires radical reform and transformation before the knowledge gap can be closed.

The analysis above has shown that we cannot extend ourselves into the future with the conceptual tools of conventional past-based science and present-oriented economics. Aristotelian teleology has much to offer that could be adapted for the purpose. It seems pertinent, therefore, to recover the teleological perspective as legitimate ‘temporal other’ to the past and present orientation of science and economics respectively. Only when the im/materiality of such goal and value orientation has gained equivalence of acceptance to scientific materialism and economic rationality can appropriate approaches to the long-term consequences of present actions begin to get instituted. In a similar vein, past competences and trust in metaphysics require our attention. We have much to learn from the way predecessors handled the realm beyond physics, from their thoughts on the matter and from their varied engagements with the im/material. Conceptual recourse to ‘the virtual’ is just one way how one might approach this latent, in/visible un/real; it is certainly not the only one.

The language we use in this enterprise is another element of crucial importance. It needs to evade reference to vision and materiality whilst avoiding a shift too far into the world

of imagination. There is no question that engagement with and taking responsibility for that which does not yet exist in conventional material form requires a very powerful imagination. This imagination, however, should not be associated with the realm of fantasy. Instead, it needs to be grounded, theoretically strong and ethically persuasive. *Forethought* rather than *foresight*, foreknowledge, prediction or precognition would be one of the words with the right kind of connotation and feel. Equally helpful is the idea of ‘calling futures to mind’ as it makes reference to action and activity of the mind.

Another positive association exists with the word *mind*, as the notion of ‘minding the future’ (or better still, futures) provides us with multiple meanings where each one of them plays on the appropriate registers^{vi}. All make reference to care and mindfulness. When the quest for mastery, control and certainty is accompanied by a quest for *mind*ing the unknown and *thinking forth* the latent and potential, the hubris of mastery is irredeemably tempered. ‘Memory of futures’ and ‘remembrance of futures’, finally, is helpful because it alludes to the implication and interpenetration of past and future and reminds us that both depend on our minds to bring them forth, activate them into existence.

Where the idea of memory becomes particularly helpful is with regard to the aids associated with memory, aids that help us remember. While we want to avoid visually based language because of its connotation with the senses and conventional materiality, the use of aids – be they visual, conceptual, moral, literary, tele-visual or social – is invaluable. We use aids for the recovery of the past: photographs to keep alive the memory of a holiday or special event, or to connect the grey-haired grandmother to her own childhood; written records to locate us, our deeds and social contracts in the public domain; film to capture for posterity ephemeral events and processes; carbon dating to

give us clues about the very distant past of materials and fossilised life forms. To aid our imagination in the realm of the future, I want to argue, we need *future aids* analogous to memory aids that help us extend into the near and distant past.

Together with an overhaul of the conceptual tool-kit this work of the imagination is on the agenda since we have as yet no obvious equivalent aids to extend ourselves into the future, to surface latent processes, uncover potential outcomes and access the ‘virtual real’. There is thus much work to be done in this field if the gap between ability to act and inability to know is to be narrowed. Finally, I want to reiterate that the contemporary problem of the future cannot be solved by exclusive focus on the future. Rather, it requires memories of past futures and the production of futures aids to inspire the kind of approaches to the future that might enable contemporary industrial societies to accompany their technological innovations to their eventual materialisation where ever and whenever this might be. In this paper I could do no more than begin this process: to open up the issues, show potential avenues for development, raise questions and bring to the surface what is currently hidden in the naturalised realm of assumptions below the surface.

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ⁱ See Adam 2004a for an extended discussion on the cultural transcendence of death and finitude; also Lifton 1979.

ⁱⁱ For a general introduction to the economic practice of discounting see Jacobs 1991; for a time-ecological perspective see Adam 1998, chapter 2.

ⁱⁱⁱ On this subject of invisible, latent dangers, see Adam 1998.

^{iv} For an excellent treatise on the subject of the virtual, see Shields 2003.

^v For the problem of quantification in the contemporary socio-environmental context, see also Adam 1995 and 1998.

^{vi} See my 2004b working paper in which the present analysis is expanded to the triple relation of action, knowledge and ethics.

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