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MINDING FUTURES

A Social Theory Exploration of Responsibility for Long
Term Futures

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Abstract
In this paper I am concerned with contemporary industrial societies' ability to extend themselves into the far future by economic, scientific and political means on the one hand and their inability to know the potential, diverse and multiple outcomes of this produced futurity on the other. I focus on this discrepancy between the future extension of action and knowledge in order to consider how we (as citizens and academics) may be better able to take responsibility for such long-term and often unknown and unknowable effects. I want to explore what strategies are available for situations where the industrial way of life creates long-term futures but our conceptual tools to know those outcomes are woefully inadequate. I seek to a) establish the status quo by outlining current practices and b) explore today's available options for forethought and moral action. In the process I revisit historical approaches to the future on the assumption that the past may well hold vital clues for today's dilemma.

Biographical Note
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<div align="center">**Minding Futures**
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Introduction: *Production of futures*
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. With the knowledge of individual finitude arises the quest for transcendence of the earthly condition. One way to achieve transcendence is to posit a world beyond the life of birth and death, 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, rules and traditions, institutions, artefacts and temples. 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 organisms. [1]

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 gets tempered, transformed into a risk factor to 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 was 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 produce 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 explore some ethical traditions we might draw on. I further scrutinise 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 encompasses attempts to enrol forgotten traditions for entirely new purposes and involves processes I would like to call 'memory of futures'.

Identification of the Problem
Gap between production of futures and forethought
To fully appreciate the problem I draw examples from the technological futures that best illustrate the disjuncture between ability to act, knowledge and moral response. These include electronic communication, nuclear power, genetic modification and nano-technology. All can be considered major successes of the industrial age; all have

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[1] See Adam 2004 for an extended discussion on this subject, also Lifton 1979.

contributed significantly to the socio-economic and cultural progress of industrial societies and their rise to global dominance. In each case, however, the coveted success is linked to unforeseen problems, which our societies seem singularly ill-equipped to deal with. This applies whether we focus on electronically organised finance 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. This success-problem axis is clearly discernible whether we attend to deliberations of proponents, opponents or regulators of genetically modified food or listen to debates on cloning and tissue engineering from a scientific, political, economic, or religious perspective.

Battle lines are clearly 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 the 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 prophesies 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 a history of ethics that extends back to Greek Antiquity, and an Enlightenment thought tradition that 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 important to look more closely at the taken-for-granted ethical and conceptual bases in question, given that they shape the arguments that are brought to bear on the contested issues, and delimit the potential range of available alternative visions. As unquestioned and unquestionable habits of mind, I want to argue, they constitute invisible barriers to knowledge practices that might otherwise close the responsibility gap addressed in this paper.

Habits of mind: moral, scientific, economic and democratic
The western moral code, as it was set out in Greek Antiquity, had a number of features that are no longer appropriate to the contemporary condition and thus tend to stand in the way of responding to the responsibility gap in a way that befits today's situation. Even with adaptations at pivotal historical turning points, argues the philosopher Hans Jonas (1984/1979) in his seminal *The Imperative of Responsibility,* a number of assumptions survived to this day. Moral action was reciprocal and focused exclusively on the intra-human realm. It was mostly contained within the city walls. Traditional ethics were consequently concentrated on actions of immediate reach and close proximity in time and space. The long-term future, in contrast, belonged to the non-human sphere of fate and chance, providence and destiny. It was

out of human reach and thus beyond ethical concern. Moreover, the nature of things, humans and the human condition was thought to be fixed and unchanging. In this ethics of the here-and-now of shared presents, the good was known and what was right undisputed. The city as domain of human influence had no more than a superficial impact on nature's balance and awesome force. That is to say, the strictly bounded transformative power of humans left nature largely unchanged in its formative and creative power. These preconditions to the traditional western moral code no longer apply. What has been assumed fixed is today subject to change. Consequently good and evil become objects of debate and definition. The contemporary operational realm of human action, finally, 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.

The changed socio-technical conditions of contemporary industrial societies thus present new ethical challenges that are rooted in the gap between the power to act and the capacity to know, and are primarily centred on the *imperative of responsibility*. It is Jonas' central argument that this imperative has no precedent in the history of ethics and thus requires ethical innovation on many fronts. Since our contemporary technological capacity impacts on nature in a new way – changing the balance of its forces, its regenerative power and its evolution, to name just a few examples – the ethical sphere 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 are extended by way of influence and impact. This imperative of responsibility requires that *responsibility be adequate to the sphere of influence*. This very reasonable demand, however, moves ethics from the tangible sphere of spatially delimited rights and duties to contemporaries and compatriots towards the open and unlimited realm of beings and organism unborn and unknowable, thus taking it into virgin ethical territory.

The kind of changes that are necessary to even conceive of such responsibility are addressed in this paper and they extend beyond ethics to an exploration of knowledge and implicit assumptions, so that this change in ethical practice may become possible. To this end I attend to the dominant conceptual tools associated with the industrial way of life, and scrutinise them for their suitability to this task. In western industrial societies these dominant conceptual tools arise from the triad of science, economics and liberal democracy where they have been naturalised to a point of having become habits of mind. As taken-for-grated habits, these ways of understanding operate at a deep structural level, delimiting the relationship to futures of our making. Thus, only when the ethical code is supported by a renewal of the conceptual tool kit, I want to argue, is the ground appropriately prepared for taking responsibility for our actions and the attendant spheres of influence. The taken-for-granted assumptions that underpin scientific, economic and political knowledge, therefore, need to be surfaced, explicated and renewed together with moral traditions identified by Jonas as precondition to an ethics of responsibility that is adequate to and appropriate for the contemporary condition.

Let us begin with science as the first element of industrial societies' triad of knowledge. Scientific knowledge in the classical (Newtonian) mode is established

around materialist, objective knowledge, causal analysis and a positivist methodology. In this traditional scientific perspective the world is made up of physical objects in motion. For natural scientists (and the scientists of other disciplines who emulated them) this perspective on reality became perceived truth until the early twentieth century when a more relativist understanding started to unsettle the hitherto unquestioned belief in a material world as distinct from, and external to, the scientific observer, and began posit a physical reality that 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 base 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 gap between science-based action and scientific knowledge of impacts 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 traditional form of science, we need to appreciate, which is relied on to guide political practice and decision-making processes. That is to say, scientific evidence (rooted in a known past) is regularly called upon to arbitrate between opposing views and positions, be this at the local, national and international level of policy. Difficulties clearly arise when the conventional 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 to 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, licences for biomedical patents and medicines, as well as international regulations governing chemical compounds, herbicides and pesticides.

The stereotype of this traditional 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. For politicians, managers and leaders of all kinds, the future is their routine field of operation whether they are making budget decisions, overseeing innovations or taking charge of the restructuring of their organisation.

The taken-for-granted assumptions that underpin classical economics form the second element of the knowledge triad that concerns us here. Classical economics, like Newtonian science, 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 potential.

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 they make 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, given that scientific knowledge is the unquestioned source of evidence and 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. Neither is appropriate for taking responsibility for possible impacts. This choice of inappropriate knowledge base for approaching futures of our making in a more responsible manner is to occupy us for much of the remainder of this paper.

First I wish to revisit the ethical questions involved and explore the *moral tools* at the disposal of industrial societies to deal with the problem of responsibility identified above. Next I address industrial societies' lack of appropriate *conceptual tools* alluded to above. I want to look at those moral and conceptual tools in more detail and scrutinise other means for their usefulness and adaptability to the problem in question before bringing the two issues together in the paper's closing section.

Problems for an Ethics of and for the Future
The traditional context for western ethics and morals was the polis, the public realm of social relations and human debate. In both praxis and reach moral acts pertaining to that realm tended to be in close proximity: with family, friends and fellow citizens. Because the effects of socio-political actions were limited in both time and space, Jonas (1984/1979: 12-17) proposes that persistence rather than change was the task of moral action. The virtuous, which was considered synonymous with ethical behaviour, was to be achieved in the here-and-now world of political debate. This present-based morality, he suggests further, was counterbalanced by an orientation to eternity: the good and the beautiful, truth and virtue, ideas and ideals. The nature of responsible action, therefore, was defined with reference to eternal values. These were to be enacted in the present, encompassing the members of specified communities.

The combination of immediacy and eternity as the realm for ethics meant that the long-term future was not deemed a sphere for human planning and moral action. Rather, it was considered the domain of gods who decided over fate, providence and destiny. Knowledge of the future therefore required mediators, in the form of oracles and prophets, sages and soothsayers, to offer glimpses of the unknown and unknowable. There were exceptions to this general rule that moral action was bounded by proximity and the present on the one hand and framed by eternal values on the other. These included, among others, the Christian responsibility to God with its attendant quest for the salvation of the soul – what Jonas (1984/1979: 13) calls the 'ethics of fulfilment in the life hereafter' – and the more recent secular politics of utopia, of which Marxism is a notable example.

In contrast to action in the Greek *polis*, actions involving non-human things in the sphere of *techne* were not considered of ethical significance. This attitude of excluding the production of things from ethical concern persisted from antiquity to the Enlightenment period. In *The Human Condition,* Hannah Arendt (1958/1998) details the differences between *work* in the realm of *techne* and *action* in the sphere of *polis*. Work produced permanence through the creation of objects, artefacts and durable things shaped from nature's impermanence and cycles of change. The world of work that produced these islands of physical permanence in the sea of change, Arendt explains, was considered outside the *polis,* the sphere freedom and moral responsibility.

An obligation towards the posterity of a technologically produced, long-term future, it seems, arose only with the elevation of science to dominant knowledge. Jonas (1984/1979) suggests that the extension of ethics to the techno-sphere emerges with the capacity to create futures that outlast and out-reach the life spans of their originators and takes on an entirely new dimension once those long-term creations have the potential to threaten not only individual existences across space and time but also the continuity of the species and life as we know it. Today's techno-futures, therefore, provide a context for responsibility that is fundamentally new and nothing in the established ethical traditions provides us with the appropriate moral tools to adequately deal with that altered condition. In contemporary industrial (and industrialising) societies the foundations for responsibility have shifted and/or extended from an individual to a collective base, from the exclusively human realm to biotic earth communities and beyond, from social life to techno-spheres, from the present to futures, from the local to the time-space distantiated[2] realm of impacts.

In order to grasp the significance of these changes for the capacity to act responsibly towards those produced potential futures, we need to look in a bit more detail at our traditional moral habits of mind and explore their limits and possibilities for adaptation as moral tools suited to the techno-futures of our making. Individualised responsibility, immediacy, eschatology and anthropocentrism are four characteristics of our deeply embedded ethical habits of mind that will serve as exemplars for the wider range of naturalised moral traditions in need of adaptation and transformation.

Individual responsibility and immediacy
Through the ages responsibility had been associated with individuals and their deeds. This approach still holds as far as actions among families, friends and neighbours, as well as fellow citizens and nationals are concerned. Since, however, the power of contemporary technological activity affects not just individuals, their immediate families and surrounding communities and nations but has the additional potential to impact on the living condition of all people now and into an open future, the moral project of modernity has become a subject of not only individual but also collective and international concern. Thus, Jonas suggests,

> …the doer, deed, and effect are no longer the same as they were in the [individual] proximate sphere, and which by the enormity of its powers forces upon ethics a new dimension of responsibility never dreamed of before. (Jonas 1984.1979: 6)

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[2] A term introduced by Anthony Giddens in the late 1970s to encapsulate processes and associated impacts that are dispersed across time and space.

Thus, for example, the technological threat to clean air and water, to fertile soil and healthy food emanating from the industrial way of life is unbounded. It is 'time-space distantiated', affecting all present and future persons since everyone depends on these basic threatened resources. The charge to safeguard, continuity and maintenance of these essentials of human existence, Nigel Dower (1998) therefore argues, transcends morality grounded in individual responsibility.

Industrial societies have the power to affect not just their immediate human surroundings but all of their earth environment and beyond to atmosphere and stratosphere. Moreover, because their actions impact not just on the present and immediate future but on all of time, this open time-space becomes *de facto* the object of our moral concern. This dual expansion of human reach in time and space, therefore lifts ethics onto an entirely new level. What arises from this is the unprecedented duty to care about what happens to unknown people (many not yet born) in unknown spaces and times. 'Duty springs from the deed already underway', writes Jonas (1984/1979: 128) for whom 'the deeds of power generate the *contents* of the "ought"'. The power to extend our impact across time and space therefore requires that new moral and conceptual tools be honed in order for ethics to become adequate to this socio-technical capacity. In this case, the 're-tooling' involves a dual shift from eternity to temporality and an extension from the known to the unknown. The latter in particular means grounding contemporary morality not only in the material, physical world but also in metaphysics, which means literally in the realm beyond physics. Let us address both these points in turn.

In a world where progress and accelerating change are the driving forces of the social system, an ethics grounded in a-temporal truths is no longer adequate to its task. The undisputable eternal good, the true and the beautiful cease to be appropriate moral guides for the relentless quest for progress where not just the environment but humans themselves are subject to such change. As Jonas notes,

> *Homo faber* is turning upon himself and gets ready to make over the maker of all the rest. This consummation of his power, which may well portend the overpowering of man, this final imposition of art on nature, calls upon the utter resources of ethical thought, which never before has been faced with elective alternatives to what were considered the definite terms of the human condition. (Jonas 1984/1979: 18)

It requires an ethic of forethought, imagination and responsibility, which is grounded not in eternity but transcendence. As such, a temporal dimension is added to the moral calculus that had been absent from traditional ethical concerns in general, and Kantian imperatives in particular.

More difficult still, the duty of care to and for unknown and unknowable futures – to that which does not yet exist – presents moral problems at the level of both principle and practice. This duty falls outside the principle of reciprocity, and outside the current legal principles of justice and obligations. It also transcends, as I show below, the political structures of liberal democracies and representative government in which future people cannot have a voice or vote. Jonas (1984/1979: 44-6) suggests that the first principle of an 'ethics of futurity' does not reside within ethics and its rules of conduct but is located instead within '*metaphysics* as a doctrine of being'. We must first agree, he proposes, that being takes priority over non-being/nothingness and thus constitutes a precondition to any moral imperative that may arise from this agreement.

That is to say, the right to exist, just like the right to clean air, provides us with grounds for moral action. It applies irrespective of whether or not the recipients of those rights are living now or yet to be born.

Jonas (1984/1979: 107) responds further to the paradox of duty to the unknown and unknowable by arguing that due to human spontaneity, the unknown is always with us, it inescapably frames our decisions as an 'invisible co-object'. Non-knowledge and engagement with the unknown, he continues, are 'nothing but the moral complement to the ontological condition of our *temporality'*. Consequently, in our encounter with the unknown, it is the spontaneity grounded in human freedom that we are charged to guard and preserve as one of our highest goods. Our moral duty, therefore, is to ensure the future of being on the one hand and to prevent a future where humanity loses its capacity for spontaneity on the other, a situation that is most likely to arise with an excessive dependence on machines. Metaphysics rather than the physical world of products, I therefore want to suggest, is the truly human domain of moral knowledge practices. Metaphysics is thus the ground that needs to be regained from the dominance of materialist knowledge.

Eschatology and Utopianism

We tend to associate the opposite of materialism with the spiritual world of religious practice. Before the elevation of science to dominant knowledge the religious approach to the future played an undeniably central and all-encompassing role in daily life. Eschatology as the doctrine of death, judgement, heaven and hell is one long-established, mostly religious way to engage with the domain of the future. For the sake of the soul's salvation, activities of earthly life are focused on the life after death. From an eschatological perspective the future and the afterlife take precedence over life in the present. In *The Protestant Ethic and the Spirit of Capitalism,* Max Weber (1904-5/1989) describes this ethic in great detail as it pertains to Catholicism and Protestantism and traces the change from an inner-worldly ethic to a worldly asceticism. He shows how this shift towards a Protestant ethic laid the broad foundations for the secular quest of the future in the here and now. When the religious sentiment slowly faded from the concerted effort to secure the future in the here-after from a position of the present, capitalism could develop unfettered toward its contemporary expression, and eschatology re-emerged in secular form as utopianism, with Marxism its most prominent exponent[3].

While we can see from the above that the future is of equal importance to traditional eschatologies, utopias and contemporary industrial societies, it is the differences between them that are of interest here. For eschatologies and utopias the distant future was the primary motive for action in the present. Yet, the extent to which the human influence on that coveted future was conceived differed significantly between the religious and secular approaches. Whilst for the former God was firmly in charge of human destiny, for the latter the future was to be forged by human action. In contemporary moral responses to the techno-future, in contrast, the relationship is often reversed. Here the overwhelming uncertainty of outcome tends to be a primary motive for non-action and preservation of the status quo. The certainties of old no longer hold, are no longer applicable. Gone is the clarity of vision that guided future-

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[3] On the subject of Marxian eschatology and utopianism, see Jonas 1984/1979, especially chapters five and six.

creating actions. Gone is the trust, which was essential to overcome doubt and uncertainty. Today's globally networked connectivity and cumulative spontaneity of responses makes the certainty of utopian futures an unachievable goal. What posed no problem for religious and utopian belief systems becomes an unsurpassable obstacle for action in a world where science and economics constitute the dominant knowledge practices. I will return to this problem in later sections of this paper where I search for more appropriate responses to this very real problem.

Anthropocentrism
The transformative power of humans has always been extensive. In modern times however, this capacity has reached undreamt of heights, changing our relationship to nature. Today nature is no longer the immutable backdrop to human action. Rather, it has become the subject of scientific invention and intervention. As such, nature has gained ethical significance and thus ceased to be ethically neutral. Our powers transcend the human realm to encompass nature and even the biosphere. This means that the anthropocentric principle, which held good for moral action since its earliest western beginnings, can be upheld no longer.

And yet, if there exists to date no socio-political structure to represent the unborn peoples of the future, what chance is there to represent other species, current and potential, and more difficult still, other forms of existence? Mountains and valleys, oceans and riverbeds, the biosphere and the stratosphere – all are influenced by our actions. None have their current and future interests represented in the socio-environmental polity of today. In this ethical vacuum science is our only arbitrator, economics our only justification to pursue the very narrow interest of the present. Despite this difficulty, however, the list of people who have sought to represent the unrepresentable are legion[4], but with to date little impact on our socio-political structures which continue to operate on the basis of existing habits of mind, unperturbed by the sound arguments for fundamental change to the industrial way of life.

In summary we can say that the contemporary condition presents us with unprecedented challenges for which traditional ethics prove substantially inappropriate and insufficient. To bridge the chasm between the techno-power to act and the inability to know effects on the one hand, and to take responsibility for the potential outcomes of those actions on the other, requires a radical change in moral perspective. It necessitates a shift and/or extension from individual to collectively constituted responsibility, from proximity and immediacy to 'time-space distantiation' and generations of unknown successors, from anthropocentrism to a moral sentiment that encompasses other species and the non-living realm of our extended earth environment.

This request for change in perspective, moreover, must be conceived neither in terms of either-or choices nor on a dualistic before-and-after basis. Rather, we need to come to an understanding that can encompass complexity: what has been continues to features in the now and in what is to come. Past and future are implicated in the explicated moral challenges of the present. Most importantly, we need to realise that a

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[4] Aldo Leopold, John Lovelock, Arne Naess, Peter Singer, to name just a few prominent representatives of that thought tradition.

shift in ethical perspective on its own is not sufficient to change moral practice. As I show in the next section of the paper, there are other barriers that work silently below the surface, unseen and unquestioned, because they too have become naturalised as unquestionable facts of daily life. Once these invisibles are raised to the surface and rendered visible they can become subject to scrutiny and public debate. De-naturalised they are transformed from habits of mind to moral and conceptual tools. As such they can be adapted and changed in service of a responsible ethic for futures of our making.

Knowledge Practices of and for the Future
The habits of mind I want to surface for examination in this part of the paper act as barriers to the ethic of responsibility discussed above. They hinder the quest for knowledge practices that could be appropriate for closing the responsibility gap between the awesome power to effect time-space distantiated change and the inability to accompany those actions to their destinations and potential effects. As I have suggested earlier, this ethical vacuum requires more than change to our ethical knowledge base. Practice can only begin to shift once our implicit assumptions are brought up to date with already unfolding im/material processes, 'the deeds already underway'.

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 pollution or contamination occur? Who was responsible? 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 and back again. The preceding events (that is, the past) would hold the clues to events in the present. This seems almost invariably so because our contemporary western thought world and understanding are inextricably bound to the thinking in causal terms. Equally, our western 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 equally 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 recognised 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.

We can think of causation by prior events as the 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 of temporal depth. 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. Marx 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 functions ascribed 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 increased until they were 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, however, 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 an ethical and moral 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. Taking responsibility for the 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.

What might this contemporary teleology involve and how might it be incorporated into the politics of our globalised world? I want to return to these questions in the last section of the paper when I bring the moral and conceptual tools together in an effort to show openings for change towards an approach that addresses current responsibility deficits[5]. First, however, I want to consider the impact of materialism, as second pillar of scientific knowledge, on the contemporary moral imperative of responsibility to and for the future.

Material reality and the virtual real
The issues under consideration here are as follows: the understanding of the real, the emphasis on matter and the reliance on quantification. All occur in a contemporary 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 hybridise[6].

In a parallel economic world, in the meantime, futures are traded on financial markets where fortunes are made on this particular 'immaterial unreal'. In the realm of electronic communications viruses of the unreal kind stalk our 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[7] of the contemporary world of our making. This

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[5] The ultimate aim of this three-year research project is to bridge the gap that arises in the interstices between the capacity to act and the inability to know, between the ability to create futures and the failure to accompany those productions to their eventual time-space distantiated destinations.
[6] On this subject of invisible, latent dangers, see Adam 1998, *Timescapes of Modernity. The Environment and Invisible Hazards*
[7] im/materiality to signify that we are referring to a reality that is, from a conventional perspective, simultaneously both material and immaterial

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, were it not for the recent exclusive association of 'virtual reality' with information technology[8]. 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. In addition to this definitional shift, it would be vital 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 would 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* and thus provides 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 business the 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 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. Their temporal domain is real time. Whilst the power of trans-national corporations and institutions increased with every step in the direction of *de*-territorialisation and *de*-materialisation of information and financial transactions, the power of the nation state seems to have decreased proportionally. Information technology, which operates at near the speed of light, has facilitated this escape from locality and provided those best equipped to use this new technology to the full with powers that were previously the exclusive preserve of gods and angels: the be everywhere at once and nowhere in particular, to affect everything for on open-ended future. With new elites operating unencumbered in the

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[8] For an excellent treatise on the subject of the virtual, see Rob Shields' (2003).

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, thus real. 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. 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 distantiated 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[9]. Quantification and causal analysis loose their pertinence. In contexts of im/materiality, latency and the virtual real they become inappropriate conceptual tools for political action. Instead, they 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 and responsibility into our

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[9] For the problem of quantification in the contemporary socio-environmental context, see also Adam 1995, 1998 and 2000.

present future in order to accompany potential effects and future oppressions in a spirit of responsibility. 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.

Minding 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. My argument has been throughout that it is not sufficient for this change in ethical foundations to prepare the ethical ground only. Rather, a whole raft of traditional scientific and economic habits of mind require radical transformation before the responsibility gap can be closed.

Reflecting on the habits of mind we have explored, it seems to me that we cannot extend ourselves into the future with the conceptual tools of conventional past-based science and present-oriented economics. Utopias would aid that particular shift in temporal direction but their association with social engineering, techno-scientific progress and certainty about the means to a predetermined goal makes them singularly unsuited to the contemporary task. Aristotelian teleology, in contrast has much to offer that could be adapted for the purpose. There is an urgent need, therefore, to recover the teleological perspective as legitimate temporal other to the past and present orientation of science and economics. Only when the im/materiality of such goal and value orientation has gained equivalence of acceptance can Hans Jonas' 'ethics of the future' and the 'imperative of responsibility' begin to get instituted. In a similar vein past competences and trust in metaphysics require our attention. We have much to learn, I want to argue, from the way predecessors handled the realm beyond physics, from their thoughts on the matter and from their varied solutions. Recourse to the virtual is just one way how one might approach the im/material, in/visible, latent un/real; it is certainly not the only one.

The language we use in this enterprise becomes crucial. It needs to evade dependence on 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. Fore*thought,* rather than foresight, foreknowledge, prediction or precognition, would be one of the words with the right kind of connotation and feel. Equally helpful would be 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 minding: 'minding the future' (or better still, futures in the plural) provides us with multiple meanings where each one of them plays on the appropriate registers. All make reference to care and mindfulness. When the quest for mastery, control and certainty is accompanied by a

quest for 'minding the unknown' and for 'thinking forth the latent and potential', the hubris of mastery is irredeemably tempered.

'Memory of futures' and 'remembrance of futures', could be helpful because both allude to the implication and interpenetration of past and future and subtly remind us that past and future 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 terms because of their connection to the senses and conventional materiality, the use of aids—be they visual, conceptual, moral, literary, televisual or social – is invaluable for the recovery of the past and is most likely equally invaluable for the uncovering of the future, for accessing the virtual real. These, however, are first thoughts only that cannot be explored in detail here but have to become the subject of another investigation.

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 to inspire the kind of approaches to the future that might enable contemporary industrial societies to accompany 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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